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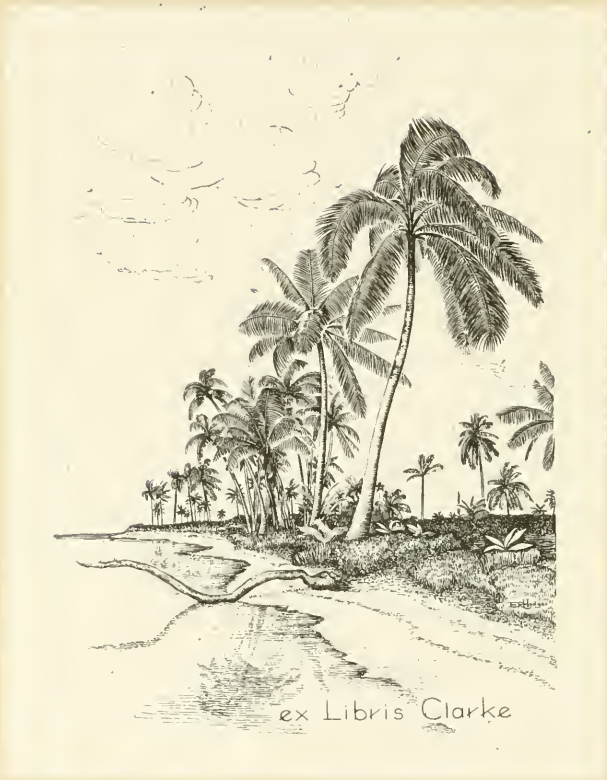
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THE TINEINA

OF

NORTH AMERICA,

BY

(THE LATE)

DR. BRACKENRIDGE CLEMENS.

(BEING A COLLECTED EDITION OF HIS WRITINGS ON THAT GROUP OF INSECTS.)

WITH

Notes by the Editor,

H. T. STAINTON, F.R.S., SEC.L.S.

LONDON:
JOHN VAN VOORST, PATERNOSTER ROW.
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PREFACE.

It is with a melancholy pleasure that I now place before the public the collected writings on the Tineina of his country of the late Dr. Brackenridge Clemens, of Easton, Pennsylvania.

Little did I think when I received his first letter in 1857, two years before he became an author, that his career was to be so brilliant and so short.

I had for some years contemplated putting together such an arrangement of his writings as would enable those who were previously unacquainted with them to profit by his remarks on the habits of new genera —genera with which we in Europe were unacquainted.

It would perhaps be a hasty conclusion were we to imagine that none of his new genera will *ever* be detected in Europe.

Through the kindness of Lord Walsingham I have been favoured with a list of Clemens' Tineina, still extant in the collection of the Entomological Society of Philadelphia, and these I have indicated by an asterisk in the "Attempt at a Classified Arrangement" prefixed to the volume. In a few cases where I have been doubtful whether I had correctly interpreted the meaning of Lord Walsingham's notes I have enclosed the asterisk in brackets, thus (*).

It will be observed that the only one of Clemens' species I have personally bred and had the pleasure of seeing alive was *Aspidisca splendoriferella* (p. 105); and strangely enough I received from Lord Walsingham last autumn a number of the cases of a closely allied species of *Aspidisca*, by which the aspen leaves near Fort Klamath, Oregon, were perfectly riddled with holes (one leaf has had at least 150 cases cut out of it). Of this species I have already had the pleasure of breeding and setting out eleven specimens; it can scarcely be identical with *A. splendoriferella* (a *Cratægus* feeder) from the different food plant, but it would be hard to say wherein the imago differs.

H. T. STAINTON.

Mountsfield, Lewisham,
April 25th, 1872.

CONTENTS.

INTRODUCTION.

PAGE

ATTEMPT AT A CLASSIFIED ARRANGEMENT OF THE TINEINA NOTICED IN THIS VOLUME, BY H. T. STAINTON vii

CHAPTER I.

LETTERS RECEIVED FROM DR. BRACKENRIDGE CLEMENS.

1. Letter of June 4th, 1857 1
2. Letter of December 12th, 1857 8
3. Letter of December 29th, 1857 16
4. Letter of May 15th, 1859 17
5. Letter of October 4th, 1859 22
6. Letter of October 10th, 1859 23
7. Letter of February 16th, 1860 29
8. Letter of June 23rd, 1860 31
List of *Tineina* sent by Dr. Clemens, July 23rd, 1860 .. 37
9. Letter of October 29th, 1860 41

CHAPTER II.

PAPERS CONTRIBUTED BY DR. B. CLEMENS TO THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

Contributions to American Entomology, September, 1859 .. 47
,, ,, Lepidopterology, No. 2, Nov., 1859 61
,, ,, ,, No. 3, January, 1860 87
,, ,, ,, No. 4, May, 1860 .. 110
,, ,, ,, No. 5, June, 1860 .. 139
,, ,, ,, No. 6, August, 1860 . 154
,, ,, ,, No. 7, Nov., 1860 .. 159

CHAPTER III.

PAPERS CONTRIBUTED BY DR. CLEMENS TO THE ENTOMOLOGICAL SOCIETY OF PHILADELPHIA.

PAGE

Micro-Lepidopterous Larvæ: Notes on a few Species, the Imagos of which are probably undescribed, November, 1861 161
New American Micro-Lepidoptera, January, 1862 179
North American Micro-Lepidoptera, March, 1862 189
Synopsis of Families of *Heterocera*, March, 1862 195
American Micro-Lepidoptera, March, 1863 207
„ „ „ August, 1863 222
North American Micro-Lepidoptera, March, 1864 237
„ „ „ „ December, 1864 .. 257
„ „ „ „ September, 1865 .. 264
Notes on *Thyridopteryx Ephemeræformis*, November, 1866 . 274

DEATH OF DR. BRACKENRIDGE CLEMENS—
(Announced to the Society, February 11th, 1867) .. 275

CHAPTER IV.

CORRESPONDENCE BETWEEN H. T. STAINTON AND B. D. WALSH OF ROCK ISLAND, ILLINOIS, ON THE DEATH OF DR. BRACKENRIDGE CLEMENS 276

INDEX 279

INTRODUCTION.

Attempt at a Classified Arrangement of the Tineina noticed in this Volume, by H. T. Stainton.

Note.—Of the species marked * Lord Walsingham found specimens in the Collection of the Entomological Society of Philadelphia, in 1871 ; of the species marked † I possess specimens myself, received either from Dr. Clemens or from Mr. Walsh. H. T. S.

Catastega, Clemens (177).
1. *aceriella*, Clemens (178).
2. *Hamameliella*, Clemens (178).
3. *timidella*, Clemens (177).

This genus is only founded on the habits of the larvæ, the imago not having been known. Possibly it belongs to the Phycideæ.

Brenthia, Clemens (133).
1. *†*pavonacella*, Clemens (134).
2. **inflatella*, Clemens (209).
3. (*) *Virginiella*, Clemens (257).

This corresponds to our European genus Simaëthis (see pp. 41 and 42). As many authors include this group amongst the Tineina I thought it best not to omit it altogether from this arrangement.

Anaphora, Clemens (56, 59, 60).
1. †*plumifrontella*, Clemens (57).
2. *Popeanella*, Clemens (57).
3. **arcanella*, Clemens (58).

This is so totally unlike any European form that I have no alternative but to place it in front of all our own genera.

TINEIDÆ.

I. Solenobia ?, Zeller (181).
1. * *Walshella*, Clemens (181).

II. Xylesthia, Clemens (53, 59, 60).
1. *†*pruniramiella*, Clemens (54).

Allied to Ochsenheimeria and Hapsifera.

III. Amydria, Clemens (55, 59, 60).
1. *†*effrenatella*, Clemens (55).

Closely allied to Euplocamus, if not identical with it.

IV. TINEA, Fabr. (49, 59, 60).

1. †*biflavimaculella*, Clemens (49, 50, 237). = *rusticella*, var. *spilotella*, Tengström.
2. †*dorsistrigella*, Clemens (49, 50). Allied to *ferruginella*, Hüb.
3. *tapetzella*, Lin. (258).
4. *croeicapitella*, Clemens (49, 51).
5. *carnariella*, Clemens (49, 51). Possibly this is *pellionella*, L.
6. †*lanariella*, Clemens (50, 52). = *biselliella*, Hummel.
7. †*nubilipennella*, Clemens (50, 52). = *fuscipunctella*, Haw.
8. *variatella*, Clemens (50, 53). This is probably *granella*, L.
9. **acapnopennella*, Clemens (233).

Group HOMOSETIA, Clemens (234).

10. **tricingulatella*, Clemens (234).
11. **costisignella*, Clemens (235).

V. EUDARCIA, Clemens (101).

1. **simulatricella*, Clemens (102).

VI. HYBROMA, Clemens (187).

1. **servulella*, Clemens (187).

VII. TENAGA, Clemens (185).

1. **pomiliella*, Clemens (186).

VIII. DIACHORISIA, Clemens (106).

1. **relatella*, Clemens (108).

The position of these genera is indicated by the remarks at p. 108 and at p. 188.

IX. INCURVARIA, Haworth.

1. **russatella*, Clemens (89).
2. **Labradorella*, Clemens (238).
3. **acerifoliella*, Fitch (90).
4. **mediostriatella*, Clemens (273).

X. ADELA, Lat. (249).

1. **Ridingsella*, Clemens (250).

HYPONOMEUTIDÆ.

I. HYPONOMEUTA, Zeller.

1. **multipunctella*, Clemens (95).

II. ANESYCHIA, Steph. (254).
1. *sparsiciliella*, Clemens (255).

PLUTELLIDÆ.

I. PLUTELLA, Schrank.
1. †*vigilaciella*, Clemens (90). = *porrectella*, L.
2. †*limbipennella*, Clemens (90). = *cruciferarum*, Z.
3. *mollipedella*, Clemens (91). Probably the ♀ of *cruciferarum*, Z.

GELECHIDÆ.

I. PSILOCORSIS, Clemens (149).
1. **quercicella*, Clemens (149).
2. **reflexella*, Clemens (150).

II. ENICOSTOMA ?, Steph. (230).
1. **Packardella*, Clemens (231).

III. DEPRESSARIA, Haworth (229).
1. **Lecontella*, Clemens (137).
2. **atrodorsella*, Clemens (230).
3. **pulvipennella*, Clemens (244).
4. **cinereocostella* Clem. (245)

IV. MACHIMIA, Clemens (147).
1. **tentoriferella*, Clemens (148).

V. GELECHIA, Zeller (217.
1. **nigratomella*, Clemens (217, 224, 260).
2. **gilvolinella*, Clemens (223, 224).
3. **mediofuscella*, Clemens (218, 224).
4. **angustipennella*, Clemens (222, 224).
5. **punctiferella*, Clemens (222, 224).
6. **cerealella*, Olivier (112, 224).
7. **apicilinella*, Clemens (223, 224).
8. **gallægenitella*, Clemens (242, 259).
9. **brumella*, Clemens (239).
10. **ornatifimbriella*, Clemens (242).
11. **Labradoriella*, Clemens (220, 224, 239).
12. * †*Agrimoniella*, Clemens (112, 224).
13. **flexurella*, Clemens (115, 225).
14. **mimella*, Clemens (116, 225).
15. **longifasciella*, Clemens (219, 225).
16. **fuscopunctella*, Clemens (218, 225).
17. **gilvomaculella*, Clemens (219, 225).
18. * †*Rhoifructella*, Clemens (114, 225).
19. **pullifimbriella*, Clemens (223, 225).

GELECHIA—*continued.*

20. †*detersella*, Clemens (116, 225).
21. * †*roscosuffusella*, Clemens (113, 225).
22. * †*rubidella*, Clemens (115, 225).
23. †*fungivorella*, Clemens (261).
24. *Salicifungiella*, Clemens (261).

VI. STROBISIA, Clemens (117).

1. * †*iridipennella*, Clemens (118).
2. * †*emblemella*, Clemens (118).
3. **levipedella*, Clemens (207).

VII. TRICHOTAPHE, Clemens (121).

1. *setosella*, Clemens (121).
2. **juncidella*, Clemens (122).
3. **flavocostella*, Clemens (113, 180).
4. **alacella*, Clemens (180).

VIII. HAMADRYAS, Clemens (245).

1. **Bassettella*, Clemens (246).

IX. TRYPANISMA, Clemens (125).

1. **prudens*, Clemens (125).

X. EVAGORA, Clemens (119).

1. **apicitripunctella*, Clemens (120).

XI. CHRYSOPORA (NOMIA), Clemens (123, 158).

1. **lingulacella*, Clemens (124).

XII. PARASIA ? Duponchel (136).

1. **subsimella*, Clemens (137).

XIII. ANORTHOSIA, Clemens (110).

1. * †*punctipennella*, Clemens (111).

XIV. MENESTA, Clemens (151).

1. **tortriciformella*, Clemens (151).

XV. ANARSIA, Zeller (127, 36).

1. **pruniella*, Clemens (128).

XVI. YPSOLOPHUS, Haw. (227).

1. **punctidiscellus*, Clemens (228).
2. **pauciguttellus*, Clemens (228).
3. **unicipunctellus*, Clemens (229).
4. *flavivittellus*, Clemens (254).

ŒCOPHORIDÆ.

I. DASYCERA, Haworth (252).

1. **Newmanella*, Clemens (252).

II. CALLIMA, Clemens (122).

1. **argenticinctella*, Clemens (123).

III. Brachiloma, Clemens (232).
1. **unipunctella*, Clemens (232).

IV. Holcocera, Clemens (225).
1. **chalcofrontella*, Clemens (226).
2. **purpurocomella*, Clemens (227).
3. **gilbociliella*, Clemens (227).
4. **modestella*, Clemens (227).

V. Endrosis ?, Hübner (119).
1. **Kennicottella*, Clemens (119). Probably our *E. fenestrella*, Scopoli.

VI. Butalis, Treitschke.
1. **fuscicomella*, Clemens (126).
2. * †*flavifrontella*, Clemens (126). Perhaps the *B. basilaris*, Zell.
3. * †*matutella*, Clemens (127). Perhaps the *B. impositella*, Zell.

VII. Pigritia, Clemens (135).
1. * †*laticapitella*, Clemens (136).
2. **ochrocomella*, Clemens (232).
3. **ochreella*, Clemens (233).

GLYPHIPTERYGIDÆ,

I. Glyphipteryx, Hübner (213).
1. **impigritella*, Clemens (214).

II. Antispila, Herrich-Schäffer.
1. **nyssæfoliella*, Clemens (102).
2. **cornifoliella*, Clemens (103).
3. **Isabella*, Clemens (142).
4. *viticordifoliella*, Clemens (142).

III. Aspidisca, Clemens (104).
1. * †*splendoriferella*, Clemens (105).
2. **lucifluella*, Clemens (143).
3. *ostryæfoliella*, Clemens (171).
4. *saliciella*, Clemens (171).
5. *pruniella*, Clemens (171).

} These three species are named from the larvæ only.

ARGYRESTHIDÆ,

I. Argyresthia, Hübner.
1. †*oreasella*, Clemens (93). = *Andereggiella*, Dup.

GRACILARIIDÆ,

I. Gracilaria, Zeller (215).
1. **superbifrontella*, Clemens (91).
2. *Blandella*, Clemens (257).
3. **fulgidella*, Clemens (92).

I. Gracilaria—*continued.*

4. **venustella*, Clemens (92, 216).
5. **strigifinitella*, Clemens (92).
6. **violacella*, Clemens (93). *Desmodifoliella* (268).
7. **coroniella*, Clemens (243).

II. Ornix, Zeller.

1. **trepidella*, Clemens (94).
2. **festinella*, Clemens (94).
3. **cratægifoliella*, Clemens (94).
4. *quadripunctella*, Clemens (177). This species is named from the larva only; it might be identical with either of the first two species, which were only known in the perfect state.
5. **Boreasella*, Clemens (237).

COLEOPHORIDÆ.

I. Coleophora, Zeller (210).

1. * †*coruscipennella*, Clemens (88).
2. **laticornella*, Clemens (88).
3. **leucochrysella*, Clemens (211).
4. **Rosæfoliella*, Clemens (250).
5. **cænosipennella*, Clemens (88).
6. **infuscatella*, Clemens (89).
7. **cretaticostella*, Clemens (89).
8. **Rosaecella*, Clemens (251).
9. **concolorella*, Clemens (211).
10. *eratipennella*, Clemens (258).
11. *caryæfoliella*, Clemens (166).
12. *corylifoliella*, Clemens (166).
13. *Viburniella*, Clemens (167).
14. *Prunicella*, Clemens (167).
15. *Ostryæ*, Clemens (167).
16. *Tiliæfoliella*, Clemens (168).
17. *Quercicella*, Clemens (168).

These last seven species are named from the larvæ only, and may be identical with some of the previous species, eight of which were only known in the perfect state.

ELACHISTIDÆ.

I. Bedellia, Stainton (95).

1. * †*Staintoniella*, Clemens (96). = *somnulentella*, Zeller (189).

II. Stilbosis, Clemens (129).

1. * †*tesquella*, Clemens (129).

III. COSMOPTERYX, Hübner (99).
1. * †*gemmiferella*, Clemens (100).
2. * †*Clemensella*, Stainton (100, note).

IV. BRATRACHEDRA, Stainton (264).
1. * †*salicipomonella*, Clemens (265).

V. WILSONIA, Clemens (253).
1. (*)*brevivittella*, Clemens (254).

VI. CHAULIODUS ?, Treit. (235).
1. **canicinctella*, Clemens (236).

VII. LAVERNA, Curtis (130).
1. **luciferella*, Clemens (130).
2. **Eloisella*, Clemens (131).

VIII. WALSHIA, Clemens (240).
1. * †*Amorphella*, Clemens (241).

IX. CHRYSOCORYS, Curtis.
1. * †*Erythriella*, Clemens (132).

X. ELACHISTA, Treitschke.
1. **illectella*, Clemens (98).
2. **maculosella*, Clemens (98).
3. **madarella*, Clemens (98).
4. *præmaturella*, Clemens (133).
5. **Braehyelytrifoliella*, Clemens (248).

XI. CYCLOPLASIS, Clemens (246).
1. **Panicifoliella*, Clemens (248).

XII. ELACHISTA ?, Clemens (255).
1. *oriehalcella*, Clemens (256). } (I imagine this is quite distinct from the true genus ELACHISTA.)

XIII. TISCHERIA, Zeller (79).
1. **solidagonifoliella*, Clemens (81).
2. *Zelleriella*, Clemens (81).
3. * †*citrinipennella*, Clemens (82).
4. **quercitella*, Clemens (221). } These three oak-feeding species seem very closely allied and possibly are not all distinct.
5. **malifoliella*, Clemens (141).

LITHOCOLLETIDÆ.

I. LITHOCOLLETIS, Zeller (62).
1. * †*lucidicostella*, Clemens (66).
2. * †*Robiniella*, Clemens (66).
3. * †*Desmodiella*, Clemens (68).

I. LITHOCOLLETIS—*continued.*
4. **æriferella*, Clemens (68).
5. *†*basistrigella*, Clemens (69).
6. *†*argentifimbriella*, Clemens (70).
7. **obscurieostella*, Clemens (71).
8. **Ostryæfoliella*, Clemens (71).
9. *†*lucetiella*, Clemens (73).
10. **obstrictella*, Clemens (73).
11. **Caryæfoliella*, Clemens (74).
12. **aceriella*, Clemens (75).
13. **guttifinitella*, Clemens (76).
14. **eratægella*, Clemens (76, 141).
15. **hamadryadella*, Clemens (77).
16. **argentinotella*, Clemens (78).
17. **Fitchella*, Clemens (139). (*quercifoliella*, Fitch.)
18. **tubiferella*, Clemens (140).
19. *salicifoliella*, Clemens (169).
20. *juglandiella*, Clemens (170).

These last two species are named from the larvæ only.

II. MARMARA, Clemens (211).
1. (*)*salictella*, Clemens (212).

III. LEUCANTHIZA, Clemens (84).
1. **amphicarpeæfoliella*, Clemens (85).

IV. PARECTOPA, Clemens (144).
1. **Lespedezæfoliella*, Clemens (144).
2. **Robiniella*, Clemens (207).

I refer these three genera, with some hesitation, to the family *Lithocolletidæ*. The larvæ in all are 14-footed, but all quit their mines to undergo their change to the pupa state; in that respect resembling the aberrant *Lithocolletis Helianthemella*, Herrich-Schäffer.

LYONETIDÆ.

I. LYONETIA, Hübner (183).
1. **speculella*, Clemens (184).

II. PHYLLOCNISTIS, Zeller (82).
1. *†*vitigenella*, Clemens (83).
2. **Liriodendronella*, Clemens (220).

III. OPOSTEGA, Zeller (179).
1. **albogaleriella*, Clemens (180).

IV. BUCCULATRIX, Hübner (108).
1. **pomifoliella*, Clemens (146).
2. **agnella*, Clemens (147).

IV. Bucculatrix—*continued.*

3. **coronatella*, Clemens (109).
4. **trifasciella*, Clemens (272).

NEPTICULIDÆ.

I. Nepticula, Zeller.

1. **saginella*, Clemens (175, 271).
2. **Platanella*, Clemens (173, 183, 192).
3. **rubifoliella*, Clemens (152).
4. **fuscotibiella*, Clemens (182).
5. **bifasciella* Clemens (183).
6. *corylifoliella*, Clemens (172).
7. *ostryæfoliella*, Clemens (172).
8. *Virginiella*, Clemens (172).
9. *cratægifoliella*, Clemens (173).
10. *juglandifoliella*, Clemens (173).
11. *caryæfoliella*, Clemens (174).
12. *villosella*, Clemens (174).
13. *Amelanchierella*, Clemens (174).
14. *prunifoliella*, Clemens (174).
15. *anguinella*, Clemens (175).
16. *platea*, Clemens (175).
17. *rosæfoliella*, Clemens (176).

These last twelve species are named from the larvæ only. Two of the first-named species, *Bifasciella* and *Fuscotibiella*, were only known in the perfect state.

CHAPTER I.

Letters received from Dr. Brackenridge Clemens.

[In the years 1857 to 1860 I received nine letters from Dr. Brackenridge Clemens; as his published writings did not commence till 1859, I place these letters altogether at the commencement of this volume. H. T. S.]

I.

Easton, Pennsylvania, United States,
June 4th, 1857.

I have become so well acquainted with you through your writings that I cannot resist the temptation to put myself in immediate communication with you. This I am the more encouraged to do, knowing full well how liberal and cordial is the interest you have displayed in the promotion and encouragement of Entomological studies,—I was about to say in England, but may I not add *everywhere?* I am sure I can; for Science is not limited by the boundaries of countries, nor prejudiced by dissimilarity of nations and national institutions, nor restricted in its range of sympathies by distance; the domain of mind is a region superior to that which is temporal; one in which its votaries live to benefit and elevate their fellow-men.

We, Anglo-Saxons of the Western Hemisphere, are, however, your natural allies, the inheritors of your civilization,

your freedom, your laws, your literature, your manners and customs, and even Old England's nursery songs whilst in our cradles,—and will you not also let us sit at the feet of the Mother and become her pupils and assistants in Science? You are probably well aware but little has been accomplished in the Entomological Department of Natural History in this country by our own students; few pursue it as scientific observers, and of these few not more than one or two have published their observations, except in a manner which makes them almost inaccessible to the young student. Hence it is that with us the study is found to be one of much difficulty and full of sources of discouragement, to which may be added the expostulations of friends against devoting time to a study so barren in the great utilitarian results attainable in other departments of science.

I have devoted my attention almost exclusively to *Lepidoptera*—why I do not know, unless I was first attracted by their beautiful colourings—and of this order more especially to *Heterocera*. The field for observation here is almost unlimited, poorly cultivated and abounding in the most interesting and beautiful undescribed rarities. It will give me great pleasure to make a collection for you during the present season, if you desire it, but you must not expect me to name many of them, for that is impossible with my present acquirements. I approach with hesitation the chief object I had in writing to you, lest requests of a similar nature may be so numerous as to render its fulfilment a matter of difficulty or embarrassment to you. But if you can spare me a box of duplicate *Lepidoptera*, it would be esteemed a great favour, and would I am confident be the means of lightening the laboriousness of classification and of advancing me more rapidly in my studies. The possession of accurately classified and named specimens would facilitate the recognition of members of the same families and genera in a far greater degree than descriptions and delineations. I have already spent a considerable amount in the purchase of illustrated works, and have in nearly every case had reason to regret the

expenditure after examining them. The illustrations of many of them are admirable as works of art, but the generic descriptions, if they contain any at all, are so meagre, so indefinite, so unsatisfactory, that I have been more than once on the point of abandoning the study in despair.

There has been too much of this appealing to the popular eye instead of the mind; a study in which the artist's pencil comes to be an indispensable aid does not deserve the name of a Science. I am however fully convinced that it is far from being indispensable, and that the study cannot become general or popular, in this country at least, until some votary of Entomology renders access to its mysteries less expensive and less discouraging and difficult than it is now.

But I have wandered from what I wish to say to you on the subject of exchanges. If you cannot supply me yourself you can possibly induce some of your many friends to embrace this opportunity of benefiting a transatlantic "brother Jonathan." All favours of this kind will meet not only my grateful acknowledgments, but be reciprocated by any courtesy I can extend to them and their own boxes returned filled with any American insects in my power to obtain. As regards my own wants, I wish none but *Lepidoptera belonging to the section Heterocera;* you will greatly oblige me by stating this to any one to whom you may make overtures, and that I desire them to be named in every instance, in the manner they may find most convenient. I do not desire moreover to enter into any exchanges until the season has nearly ended, for I shall be too much occupied to attend to the matter previous to that time. Perhaps I should also tell you I have never made exchanges, and have been induced to address you on the subject only in consequence of the generous and cordial spirit you display towards the young Entomologists of your own country. If my application is successful I have no doubt but that I can make arrangements for the reception and transmission of cases through the publishing house of H. Baillière, of New York City and London, from whom I receive my foreign books. This reminds me,

en passant, I have just been informed by that house the Weekly Intelligencer for 1856 is out of print. Can you obtain a copy and have it charged to me at their house, 219, Regent Street, London?

Should I not, even at the risk of being egotistical, give you some introduction to myself? I am yet young, as you have perhaps conjectured, a physician by education and profession, and a graduate of the University of Pennsylvania; but here, I fear, my scientific qualifications to your regard must find an end. I stand merely on the shores of Science, gazing on the immensity before me. And as I follow with my eyes the full-freighted Intellects, which, fanned by the wings of Fame, sail over its placid waters in search of unknown Truths, I am filled with doubts and the feelings of despair, which arise from a consciousness of my own imperfections.

I shall, I fear, prove an unprofitable correspondent. I have never published a single sentence in relation to my studies, although I have, of course, kept a note-book, in which such observations as I deemed worthy of record have been noted. I have proposed to myself several problems for solution, if possible, during this season; some in relation to the physiological uses of various organs, in order to understand their value and significance in classification; the determination of the forces by the action of which wing-dilatation in *Lepidoptera* is produced; and I am now especially endeavouring to comprehend the signification of the neuration of their wings. I worked at this subject for some time before knowing it had been introduced into modern classification, endeavouring to ascertain whether it could not be used as a dominator character in the formation of families and genera. I have thus far failed to satisfy my own mind in regard to its real value, chiefly in consequence of being unable to recognize a sufficient number of the genera of each family. Nevertheless, in the absence of other means of classification, as, for instance, the capture of a new imago, or the examination of mutilated specimens, I have relied on it exclusively for the determina-

tion of family and genus. I am unable, however, to decide whether it is of sufficient importance to deserve my attention and study. Will you please advise me on this point, or inform me whether the question has been solved?

In examining your "Manual of British Moths and Butterflies," with which I am very much pleased, I find no direct notice, in your remarks on the family *Psychidæ*, of a curious fact which attracted my attention a short time since, nor can I find it noticed in any other work in my possession. A friend presented me with a few cocoons of a member of the genus *Psyche*, which he found during a visit forty or fifty miles from this place. On opening one of them I found, much to my surprise, the female never leaves its chrysalis case, and that its interior was filled with young larvæ, some free and others visible through the transparent coats of the ova; and that these, together with a quantity of yellowish, floss-silk with which the interior was filled, constituted all that remained of the female. Its development can consequently never advance beyond the condition of a chrysalis, which I supposed heretofore never occurred. I am now rearing a large colony of the larvæ for the purpose of writing the history of the insect, for I believe it to be undescribed, and ascertaining how the fecundation of the ova is effected by the male. This is at present a complete mystery to me. I have never before met with any members of this genus, and would beg to inquire if the facts above mentioned are usual in their history, or does the female escape from the chrysalis case and remain within the cocoon?

Permit me to add an observation I made two years ago, and if it be of any use in determining a doubtful question, which I have never seen rationally explained, you are at liberty to make any use of it you wish. It is a description of the means by which *Attacus Cecropia* effects its delivery from its cocoon, and almost merits the designation of *Insect parturition*. I have reared great numbers of this insect, which is one of our largest and most beautiful moths, but have never been successful in witnessing the actual escape

from the cocoon, except in this one instance. I copy from my note-book as it was recorded at the time of observation.

"My attention was first attracted by a crackling and move-
" ment within the cocoon, and after attentively observing it,
" I perceived its inmate had already engaged itself in the
" work of delivery and was producing a dilatation of the
" tapering portion, where the threads are left thin and con-
" vergent to the larva. In a short time I could perceive a
" dark outline dimly shown through the lax structure of the
" apex, and could notice more clearly the dilating effort made
" by the imago, and that it was confined principally to two
" points of the circumference of the cocoon. After making
" an effort of a few seconds' duration to advance itself, the
" imago rested for the purpose of recovering from its fatigue,
" and also, as I afterwards ascertained, of moistening the
" structure with a colourless secretion, which exudes from
" the mouth and dissolves the gummy substance by which
" the threads of the cocoon are agglutinated.

"Presently the head, eyes and anterior portion of the
" mesothorax were protruded from the apex and were clearly
" visible, though still covered with many unruptured threads,
" and the insect rested in this position for a moment. When
" the extruding efforts were recommenced, I could distinctly
" see that the dilating and extruding impulse was produced
" by an outward and backward movement of the wing-shoul-
" ders, the motion of which was as distinct and evident as
" that of one's elbows would be were the human body simi-
" larly confined.

"When the thorax was finally protruded the feet were
" folded upon it and appeared not to have been used as aids
" in any manner. Indeed, the pressure of the cocoon around
" the confined portion of the body was apparently too great
" to admit of any movement of the legs. After the liberation
" of the feet, the insect used them as aids in the extraction
" of the abdomen, which was very large, the specimen being
" a fine female. But the chief means by which abdominal
" delivery was effected, was a curious vermicular movement,

" which liberated small portions at a time from the constrict-
" ing part of the cocoon . . . .

" I think the threads of the cocoon were ruptured by being
" brought in contact principally with the anterior portion of
" the mesothorax, for this was the most advanced part of the
" body when I first obtained a distinct view of the insect;
" although just before the head and eyes, which occupied a
" lower plane than the mesothorax, were finally extruded,
" several threads in contact with them were ruptured without
" causing the least injury to the eyes. The noise caused by
" the rupturing of the threads very strongly resembled that
" produced by the gnawing of a mouse.

" The most remarkable part of the whole process was the
" dilating force which the insect exerted by means of the
" wing-shoulders, for they were at once the means of ad-
" vancement in the process of delivery of the thorax and of
" dilatation of the apex of the cocoon. The entire muscular
" power of the thoracic muscles seemed to be concentrated
" energetically on the performance of this duty. After the
" dilatation of the resisting part of the cocoon, in which the
" thorax might be situated, the wing-shoulders appeared to
" be used as the points of support from which the meso-
" thorax was impelled against the resisting structures.

" The entire thoracic case at this period is soft and flexible,
" and every effort after the insect was discernible was marked
" by an obviously increased breadth between the wing-
" shoulders and flattening of the convex surface of the
" thorax. I should state possibly, that I mean by the term
" 'wing-shoulders' that part where the nervures converge
" to become attached to the thorax. * * * The delivery
" was accomplished in about ten minutes after I first ob-
" served the movements within the cocoon, but I believe the
" entire time to be much more."

I trust my description of this process is sufficiently clear to enable you to understand it. I intended to submit it to re-examination this season, but all my moths eluded my vigilance.

I have directed Mr. Baillière to send me the "Weekly Intelligencer" by every steamer, so that I can have the satisfaction of knowing what others are doing among the World of Insects. I have your Annuals for 56 and 57, and am about to order that for 1855.

Permit me to hope, in conclusion, I have not wearied you with my letter, &c., &c.*

[A considerable portion of the foregoing letter I inserted in the "Entomologist's Weekly Intelligencer," Vol. 2, p. 175, in the hopes of thereby securing some correspondents for Dr. Clemens, who would exchange insects with him. I do not appear to have any copy of my reply to this letter. H. T. S.]

II.

EASTON, PENNSYLVANIA, UNITED STATES,
December 12th, 1857.

ALLOW me to thank you most cordially for your kind attention to my previous letter. It has been the means of securing me, as correspondent, a gentleman whom I do not doubt will prove an estimable and worthy one, since I find his name entered in the List of British Entomologists in the Annual for 1856, as one who is willing to assist beginners. This fact alone was sufficient to command my confidence, and to induce me to embrace his offer to exchange with pleasure.

I intend to send you in my first box of exchanges to Mr. Logan some specimens of an exquisitely beautiful leaf-miner, which I found on the 18th of October, in the leaf of the locust tree (*Robinia Pseud-acacia*). I was fortunate enough to secure about fifteen or eighteen pupæ and two

* This letter is signed "Breckenridge Clemens," and as the first I had received from him I learnt from it his name, and have repeatedly written and spoken of him as Breckenridge Clemens: the next and all subsequent letters are signed "Brackenridge Clemens." H. T. S.

larvæ. The enclosed sketches represent one of the larvæ, two views of the pupa, a mined leaf, and the neuration of the wings of the perfect insect. I endeavoured several times to make a creditable representation of the insect, but was compelled unwillingly to give it up, being too much of a novice in colouring. I send you the imago more for the purpose of being assured I have classified it correctly, than as an addition to your cabinet. I find with perhaps unnecessary feelings of chagrin, that the pins sent me by Messrs. Edleston and Williams, and marked No. 20, are too large for its thorax, and consequently prevent the wings being properly set. This may be owing, however, to want of delicacy in manipulation on my part, but I can perceive no difference between 19 and 20, except that the former is slightly longer than the latter. Should there be no observable difference between them in diameter?

When I first noticed the leaf mined by this larva, I supposed it was tenanted by a leaf-spider, and examined it with no expectation of finding a "Micro." The larva mines the underside of the leaf, and it is situated always on one side of the midrib, sometimes near the base of the leaf, sometimes about the middle, but most frequently near the free extremity. The epidermis of the inferior surface of the leaf covering the mined portion is a pure white colour, and is stretched over a fold made by the margin being drawn towards the midrib. This fold is seen on the upper surface as a ridge in a brownish patch of variable size and shape. The larva feeds on the cellular substance found between the network of veins in the leaf, leaving them untouched and perfectly cleaned. It is doubtless owing to this circumstance that the fold in the leaf is formed, and increases as the external membrane is denuded of cellular matter, and its nutrition prevented by the operations of the little miner. I supposed, at first, that the epidermis of the inferior surface must be lined with silk, but find on examination that it is not, and therefore the fold cannot be produced by any agency of the larva directed to that end. I noticed, however, several instances in which

this membrane had been ruptured and closed by the larva with a web of silk. Although the larva lives thus apparently secure and concealed from its enemies, it is not safe from the attacks of a minute Ichneumon, which had destroyed great numbers, and in retaliation I constituted myself the executioner of many of the assassins.

The larva is 1·5 of a line in length. *The head* is smaller than the diameter of the first segment, capable of being partially retracted under it, nearly colourless, except at the sides and the pointed, projecting mandibles, where it becomes brownish. *Body* almost cylindrical, tapering posteriorly, very slightly coloured with green, with a crimson dorsal line, attenuated from its origin on the fifth segment to the ninth, where it terminates in a point between two irregular patches, chrome-yellow. Another specimen I examined did not have the chrome-yellow patches, but the dorsal line was present. Feet . $\frac{3}{3}$ . . $\frac{3}{3}$ . . . $\frac{1}{1}$=14.*

The cocoon is composed of silk, perfectly white and quite densely woven, is nearly flat above, irregularly elliptical and attached by a web to the sides of the fold in the leaf in which it is constructed. It is not uncommon to find two in the same mine attached at their extremities.

The pupa. The cytotheca is extended over the gastrotheca, the extension being occupied by the antennæ, wings and legs, particularly by the last pair, which appear as an elongated, free spine. The cephalotheca is somewhat hooked and pointed at its extremity. The colour is dark brown, the cytotheca being darker coloured than the abdomen. When the imago is liberated the pupa case is thrust through the cocoon and internal epidermis, and fixed in the cocoon by means of the minute hooks or spines on the dorsum of the pupa.

The perfect insect. The first imago appeared on the 20th of October, and the brood continues to appear for about

* I should perhaps explain that in this formula, which I am in the habit of using in my note-book, the dots represent footless segments of the body, and the figures segments having feet, together with their number. B. C.

a week or ten days. There were two pupæ, which I hoped at one time would remain in the chrysalis state until spring, and that I should have the pleasure of sending them to you; I was much disappointed when I found, about the middle of November, they had also appeared, though exposed to an out-door temperature. I failed to ascertain in what situation the eggs of the autumn brood are deposited, and am at a loss to divine by what provision the spring brood is brought into existence. When I found the pupæ, October 18th, the locust tree and our other forest trees had begun to shed their leaves, and before all of the brood appeared the tree was entirely denuded. They cannot appear as a general thing, therefore, before the fall of the leaf, although some of them do, and those which remain in the leaves as pupæ are doubtless far removed from their food plant by the winds, when they do make their appearance. Do you think it is probable that the eggs of the autumn brood are deposited on the young buds?

Description. *Head* and salient, frontal toupet, greyish-brown. *Antennæ* dark brown above, whitish beneath, and *very slightly* annulated with white on each joint. *Face* and *palpi* silvery white. *Anterior wings* golden yellow, base fuscous, with *four costal* and *three dorsal* or internal *streaks silvery white, and all black-margined on both sides:* the *first costal streak* is curved posteriorly, and terminates in a point in the middle of the wing; the *second costal*, likewise curved, joins the *first dorsal streak* near its point, the latter being longer and more oblique; the *third costal* has the curvature of the preceding streaks and unites with the *second dorsal*, whose curvature is reversed,—in some instances this streak is shown as two distinct spots; the *fourth costal* and *third dorsal* are spots, placed on the margins just before the *apical spot*, which is black and almost round; the elongated scales, forming the posterior elliptical outline of the wing, are tipped with black; cilia long and grey. Posterior wings dark grey, cilia the same. Al. exp. 2·5 to 3 lines.

Classification. Having no books of reference treating of

this tribe, I was, of course, entirely unable to locate it, until a few weeks since, during a short visit to Philadelphia, I was able to consult hastily, at the Academy of Natural Sciences, a copy of your excellent work on "Tincina," forming part of *Insecta Britannica.* It is a source of regret with me that I cannot obtain a copy, having been assured it is out of print. However, by carefully comparing my representation of the neuration of this leaf-miner, with the pterological delineations in that volume, I was at once enabled to refer it to the family *Lithocolletidæ.* Then, turning to your remarks on the family, satisfied myself at once as to the correctness of the reference, having carefully examined the insect before leaving home. You are probably prepared for any degree of temerity on the part of the young student, but will you not be surprised if I doubt whether it belongs to the genus *Lithocolletis?* This doubt, however, is dependent on the question whether the neuration of *Lithocolletis Messaniella* is correctly and accurately delineated: I do not, however, for a moment doubt it with no evidence to the contrary. If you will refer to it in the above work you will perceive, that whilst mine is evidently of *the same type,* there is a marked modification in the neuration of the anterior wings. The *sub-costal nervure* in mine throws off, near the apex of the wing and in quick succession, *two marginal nervules, an apical and post-apical nervule,* whilst the *median is entirely wanting.* I am unable, at present, to determine the value, if it has any, of this modification. I have no other specimens of this family with which to compare it. But my investigations up to this time, with regard to the value of neuration as a basis of classification, and its significance as a "dominator * character," imperfect though they necessarily are, in consequence of my limited entomological resources, have constantly indicated to me the existence of three general laws, which, however, I do not wish to be under-

* In his next letter Dr. Clemens proposed to substitute the word "predominant" for "dominator." H. T. S.

stood as announcing positively, or as the final inductions to be drawn from my studies. These are:—

1°. *That in any given species, the pterogostic characters of the wings are invariably identical in all individuals of that species.*

2°. *That modifications in the neuration of the posterior wings, which involve a change of type, constantly carry with them physical changes and differences in habits, recognized as family distinctions.*

3°. *That variations from any given type in the neuration of the anterior wings in the same families, or those in which the neuration of the posterior wings is similar, indicate the existence of minor physical modifications and differences in habits, necessary to constitute generic relationships.*

The latter proposition stands on the least positive basis, but I trust I shall be able to demonstrate the correctness of all at some future time; provided I do not hereafter ascertain I have generalized hastily and unphilosophically. For this purpose I am extending, as industriously as I am able, the data from which they are deduced. This, at best, is slowly and laboriously, and I do not conceal from myself that there exist many difficulties and perplexing problems, which even the cleverness of Guenée has not clearly elucidated. If neuration has any real value as a "dominator * character," *indicating natural affinities*, its verification will not be the work of one student, nor one pair of hands, but of many industrious painstaking workers.

Permit me, therefore, to hope your judgment will approve a suggestion I will take the liberty of making, as one much interested in the usefulness of your "Natural History of the Tineina" to the entomological student. This is, that the neuration of each member of a genus be given in the work, in order that all the modifications, if there be any, may be shown. I think this would increase its cost but little, if any, and I am sure would be regarded by every systematist as a

* See note in the preceding page.

most valuable addition. A clever worker could learn I am sure to denude and delineate in one day the wings of the whole number described in a volume. I am awaiting, with many pleasurable anticipations, the 2nd volume of "The Natural History of Tineina," and am happy to perceive, by the announcement in the "Weekly Intelligencer," that it treats of the genus in question.

I suppose it is my right to name the insect which I have described, and would propose *Lithocolletis Robiniella.* Does it make a good specific name? The botanical genus *Robinia* was created as a mark of distinction to John and Vespasian Robin, French Botanists.

Will you please return the enclosed sketches? I suppose they would be of little value to you. You are, however, at perfect liberty to make a copy and use it as you please. During the next season I hope to be able to collect additional parts of its history and to send you some of the pupæ, with perhaps many others. I have made drawings of the larvæ and mined leaves of several other leaf-miners, met with during the course of the past season, but did not attempt to rear them or secure the imago, having at that time no pins with which to transfix them. I have just received a copy of the "Entomologist's Companion," from which I hope to derive much general information, that I need at present, on this subject. Do you know any good means of distinguishing the larvæ of leaf-mining *Diptera* and *Coleoptera* from *Lepidoptera?* If you do, please tell me or inform me where I can find it.

I have written a longer letter than I intended when I began, and must now beg you to believe me with sentiments of high esteem and respect.

Copy of my Reply to the above, dated January 11*th,* 1858.

Your letter of the 12th December lies before me; an extract from it will appear in the "Intelligencer" of the 16th inst., and in that of the 23rd I shall have a leading article calling attention to your discovery.

Mr. Logan is a very good entomologist and one imbued with the right scientific spirit. I am glad he has written to you.

Your insect is no doubt a *Lithocolletis* and possibly one already named *Acaciella*, but on this point I can speak more decidedly when I see your specimens.

You will have noticed lately in the "Intelligencer" I have introduced one or two paragraphs referring to American *Micro-Lepidoptera;* if you can meet with any of the species to which I have alluded I should be very glad of specimens.

The pins No. 19 and 20 are almost identical, but No. 19 is perhaps a trifle the more slender; either of them should do for a *Lithocolletis;* one collector here uses even No. 19 for *Nepticulæ!*

The eggs of the autumn brood of your insect are probably deposited on the young bud of the *Robinia*, but some autumnal species appear to hybernate and perhaps deposit their eggs in spring.

All the *Lithocolletides* of which the neuration has been investigated agree with the figure of *Messaniella* in the "Ins. Brit."

Your three laws approximate to the truth without attaining it.

1°. In any given species you may meet with individuals of aberrant neuration: a kind of deformities—but such examples are naturally very rare.

2°. You will sometimes meet with minor modifications in different species of the same genus, with no apparent modification or difference of habits.

3°. That neuration often gives us positive characters when all else appears hazy and indistinct is a great convenience—we perhaps suspect a difference, and the investigation of the wings confirms our suspicions.

I return your sketches (of which I have had a copy made), with many thanks for the sight of them; I see in the anterior wing you have committed the error of turning it the wrong way up. In the enclosed sketch I have marked in pencil the veins which I fancy you may have overlooked, and hence caused the discrepancy of which you complain.

Dipterous larvæ deposit their excrement at considerable intervals; it never forms the same continuous track that it does in the mines of Lepidopterous larvæ: for distinguishing Coleopterous mining larvæ there is nothing for it but experience,—I am myself often mistaken. Sometimes I neglect Lepidopterous larvæ, fancying them Coleopterous; at other times I collect Coleopterous larvæ, thinking them Lepidopterous.

Excuse my letter not being so long as yours, for the length of which I am sure no apology was necessary, as it contained so much matter of extreme interest to me.

I enclose you a letter from Dr. Herrich-Schäffer of Ratisbon, one of the most energetic and voluminous entomological writers in Germany.

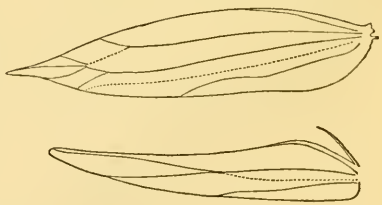
If you read German I would recommend to you Frey's "Tineen und Pterophoren der Schweiz;" though it has no plates, it is a most valuable work, and I think it more interesting than my volume of the "Insecta Britannica."

III.

Easton, Pennsylvania, United States,
December 29th, 1857.

[Received 18th January, 1858.]

I write merely to correct a mortifying error in my delineation of the neuration of the anterior wing of *Lithocolletis Robiniella*. When I wrote I was quite confident of its correctness from having made frequent and, as I supposed, careful examinations with single lenses, magnifying from twenty to about eighty diameters. But being unable to comprehend the meaning of the disagreement between your delineation in the same genus and mine, I was induced a short time since to examine critically a copy of that which I sent you, when I became convinced that the wing must be represented *upside down*. A careful denudation of another wing rendered this painfully apparent, while, at the same time, the renewed examination, much to my surprise, revealed I had likewise omitted the branch of the *subcostal nervure*, which closes the discoidal cell. The representation I now enclose I am sure is correct, and an examination of it will show you there is no essential difference in the neuration of *Lithocolletis Robiniella* and *L. Messaniella*, though found in opposite hemispheres.



I shall be much obliged to you if you will also make a correction in the text of my former letter, and substitute "*predominant*" in place of "*dominator*" characters; and,

should you deem it worthy of print, to strike out such portions as in your judgment the rectification I have made may render proper. It would doubtless be advisable likewise to suppress the deductions which are there announced as general laws, though it was merely for the purpose of calling your attention to the facts alluded to in them; for whilst I feel much confidence in their general correctness, and in the value of neuration as a predominant character indicating certain natural divisions and affinities in the members of the order, I am also conscious the announcement is premature. I have been unable thus far to adduce any positive physiological reasons in support of the deductions, and I am aware, until this can be done, its value rests entirely upon an empirical basis.

IV.

EASTON, PENNSYLVANIA, UNITED STATES,
May 15th, 1859.

So long a time has gone by since you have heard from me, that I fear you have forgotten your former American correspondent. However this may be, I assure you my devotion to the study of Entomology is as enthusiastic as formerly, and from a student I have become a worker. Let me tell you what I have been doing for Entomological Science during the long interval in which you have heard nothing respecting me.

At the urgent solicitation of myself and others, Professor Henry, Secretary of the Smithsonian Institution, has consented to authorize Entomological collections in behalf of the Institution throughout the United States, and at the military stations in the Indian territories. This will doubtless result in accumulating an immense amount of material, which will be distributed amongst students, who devote themselves to special orders, to methodize and describe. Then the Institution is preparing to issue a complete collecting manual, giving minute and specific directions in the collection, preservation

and method of observation of the various orders of insects. The portion referring to *Lepidoptera* was written by myself, and enters fully into the subject.* For the purpose of distributing it widely over the country, it will appear in the first place in the Smithsonian Report for the present year, and a large number of the article itself will be distributed by mail as a circular, the number of reports not being sufficient to enable us to supply all the various points of our large territory.

The effect of this, however, will be seen in the future, and I have but little doubt that the future of "Entomology in America" will be a bright one. I have but just completed a Synoptical Paper on the *Sphingidæ* of the North American Continent, with descriptions of nearly 100 species. Of course all these are not my own, for I have been compelled to extract many from Mr. Walker's List of the British Museum. It is intended, however, only as a "basis" on which the information so much needed respecting species in our country can be conveniently worked up. It contains some new features on which you must decide when you see it. Now you must not smile when I say, that I have added to it an Essay on the Classification of the Order or rather of the *Heterocera*. You must remember that here we are untrammelled by any established reference books, which tie down minds to particular ideas. With us every thing has yet to be done, and in what I have written I have endeavoured to treat the subject philosophically and with reference to what I regard as *natural*. You will doubtless find many ideas advanced with which you will be inclined to take issue, and if they are shown to be erroneous it will simply be a source of pleasure and satisfaction to me. This paper will be published during the summer in the Journal of the Academy of Natural Sciences in Philadelphia, and will be distributed to students almost gratuitously. I shall have the honour to send you an early copy of it.

I have, however, something else to tell you that will perhaps

* "Instructions for Collecting Lepidoptera." Smithsonian Report for 1858, pp. 173—200. H. T. S.

give you more pleasure. Since completing the Synopsis of the *Sphingidæ*, I have been working at the "Micros" or rather the *Tineina*. I could have accomplished much more than I have, had I not suffered during last summer from several weeks of illness that confined me to my room. The majority of my summer observations were lost, or at least their results. During the fall, however, I managed to collect and described about sixty larvæ. The perfect insects have been appearing during the last week or two, but many I fear have died in the pupa state. I will give you a list of the genera I have recognized; and some of the species correspond so remarkably to your descriptions of some of the British species, as to induce me to believe they must be identical.

The following are some of the genera, which I have recognized beyond any doubt:—

Plutella; Coleophora; Gracilaria; Ornix; Cosmopteryx, a most beautiful species, which I think must be very like *Drurella; Tischeria*, and some other species belonging to the same family, which I will not venture at present to designate generically; about fifteen species of *Lithocolletis;* and some *Nepticula* larvæ, which have not yet produced perfect insects. I have just finished the study of a species about which I wish to write to you specially.* It has all the structural characteristics of *Asychna terminella*, except that the *submedian* vein of the anterior wings is not furcate at the base, and that the labial palpi are *not* drooping. The specific description of *Terminella* corresponds, too, most remarkably, to the species under consideration. I observe you say that *Terminella* is a discrepant species in the genus under which it is placed, and that its embryonic history is unknown. I will, therefore, give you briefly the larval history of the species in hand, hoping you have by this time ascertained something respecting *Terminella*, and can inform me whether they correspond, and whether the species has been removed from the genus *Asychna*.

* Afterwards recognized as an *Antispila* and described as *A. Nyssæfoliella*, Proc. Acad. Nat. Sci. Phil. Jan. 1860. H. T. S.

The larva mines the leaf of *Nyssa multiflora*, in numbers that are perfectly incredible.

It is subcylindrical, flattened above and beneath, with the segments rounded and projecting laterally; a dorsal plate on first segment; no legs or prolegs, but a tubercle on the ventral surface of twelfth ring, with a circlet of hooks. Head broad, circular, flattened, thin and retractile. Head dark brown, shield brownish; body very pale green, with dark atoms along the dorsum; ventral surface with a line of double black spots. After the last moulting the shield becomes black, with a black vascular line.

In the mine of the larva the entire parenchyma of the leaf is devoured, leaving the upper and lower epidermis almost transparent. When it prepares for pupation the larva weaves an oval cocoon within the mine; and when the upper and lower membranes are well carpeted within its limits, they are cut in an oval form, and the cocoon permitted to fall to the earth.

The two ends of the cocoon are still open, and the larva attaches it by little cables of silk to surrounding objects on the ground, to prevent the rains of fall and spring from carrying it away.

The pupa is thrust from the cocoon at maturity, the case being extremely thin and delicate. I have not yet opened any of the cocoons to describe the pupa itself.

The head of the imago is almost globose, without ocelli, covered with closely appressed scales; front somewhat produced in the middle at base of the tongue. No maxillary palpi; labial separated, slender, curving on the sides and ascending to about the middle of the front. Tongue about half as long as the thorax. Eyes elliptical. Antennæ rather thick, but filiform, short, somewhat more than *one-half* as long as the anterior wings. Abdomen nearly twice longer than the thorax beneath. Hind tibiæ slightly pilose, with a pair of spurs near the middle and a terminal pair.

If I have not mistaken the structural affinities of this species, it belongs to a genus not described in your "Insecta Brit.," and if none has been formed for its reception I propose

to describe it under the name of *Diacopia*. If you can enlighten me on the subject, your valuable aid will be highly appreciated.

As soon as I can arrange my materials, I intend to begin to describe *Tineina* in the Proceedings of the Acad. of Nat. Sciences, and will send them to you regularly. And what will be still more acceptable, as soon as I have supplied a few friends and the Cabinet of the Academy with specimens I have classified, I will be happy to supply your cabinet also, but I will promise to send you those alone which I have classified or cannot classify. I can do this without the least expense to either you or myself; the Smithsonian Institution will take charge of these transmissions, and deliver them to you without any expense. Their exchanges with Europe take place but twice a year however, and as the packages are all included in one large box, it might not be the safest mode that could be adopted.

* * * * * * * *

I never received the number of the "Intelligencer" in which you noticed the differences between *L. Acaciella* and the American *Robiniella*. I met, however, during last spring Baron Osten Sacken in Washington city, and he informed me he had visited you when in London and that you had given him the article. He was kind enough to send it me the next day, but his messenger lost it on the way.

Is Professor Frey's work the only good one on *Tineina* you can recommend to me? Are there none in French? I do not yet read the German with sufficient ease to enable me to use the former to advantage. The recognition of genera is much more laborious to the American student than to the Continental one, for we have no cabinets of classified specimens that we can consult. Your very excellent "Insecta Brit." and the "Nat. Hist. of the Tineina" have been of great value to me, but I suppose there are many genera which are not included in the former, and it will perhaps be years before the subject is exhausted in the latter. If you

know of any work which you think will be valuable to me, and will extend my knowledge of genera, by giving me the title you will add another to the many obligations I feel under to you for past kindness and encouragement.

* * * * * * * *

I determined long since to form no collection for myself, and freely give away all specimens I have systematized. Such specimens as are new I add to the collection of the Acad. of Nat. Sciences in Philadelphia, where any one may find them.

V.

EASTON, PENNSYLVANIA, UNITED STATES,
October 4th, 1859.

I BEG you to accept the contents of the accompanying box. I collected the cocoons especially for you a day or two since, and they are all full fed on their food plants, not in vivaria. I intended to send this with my next letter to you, but as a steamer leaves on the 5th inst., I will defer writing until I can send also a copy of my paper on the *Sphingina*, and perhaps my first on the *Tineina*. Then I send some species, which I fear may appear on the voyage to you, and to anticipate the event if possible I send them immediately. A few specimens of *L. Robiniella* are at present in their mines though nearly full fed; these I hope will become pupæ ere you receive them. The cocoonets are separated from each other by thin layers of cotton, and a bit of paper in each lot giving their names. Commencing at the top is a beautiful species that will surprise you. I wish I could enjoy your surprise: *Phyllocnistis vitigenella*. The rest are members of the genus *Lithocolletis*—perhaps not all specifically distinct—except some *Antispila nyssæfoliella*.

With respect to this and an allied *new genus* I have something of interest to tell you. The mine of *Phyllocnistis* is not correctly described in the "Insecta Britannica," unless the mines of your species differ considerably from ours. The larva is apod. Particulars hereafter.

If you receive this lot of cocoonets safely, it will be preferable to sending the perfect insects, both to you and myself. You can then set out your own specimens, for it is an act in which I am not yet proficient.

I beg you will pardon the informality of this *scrip*,* almost a transatlantic despatch, and believe me, &c.

P.S.—The *P. vitigenella* have just formed their cocoons. They will appear in about a fortnight from this date; perhaps one may come out before this box reaches you. Two specimens are in the larva state yet, but are preparing to form their cocoons. On the top I add a few cocoonets of a new genus, *Aspidisca splendoriferella*.

VI.

EASTON, PENNSYLVANIA, UNITED STATES,
October 10*th*, 1859.

I HAD the pleasure to send you by last week's steamer a little box containing a few of the cocoons of some of our Micros. I hope you will receive them safely, and that their confinement and transatlantic voyage may not injure the pupæ. I do not desire any return for them, nor was the box sent under any expectation or hope that you might be induced to make a return of your own insects. The hope that I may thus give you some pleasure in return for your kindness and courtesies is a sufficient remuneration, and I dare say the satisfaction and pleasure I had in sending quite equals what you will feel on their reception. Should the pupæ of this lot produce imagos, I will gladly send you others hereafter. This I can easily do, probably during the summer, as but ten days at most will expire before they reach you, and my observations, during the last and the present summer, have put me in possession of the history of many larvæ. Some of them are very troublesome to rear, and in many instances

* The slip of paper on which the above letter was written, in pencil and extremely small, is five inches long and less than 1¼ inch wide. H. T. S.

I have been entirely unsuccessful in carrying them through their transformations. One species, which I found this season, for the first time, in abundance, all I believe died in the larva state, notwithstanding the assiduous attention I gave it and all my devices contrived for its benefit. I will not trouble you to read the particulars of its history,—unfortunate history I should say,—at the present time.

It is with feelings of some trepidation that I send by the present post my first paper on Entomology. Need I say I shall be pleased to have your opinion of it? Do not hesitate to indicate that which you conceive to be objectionable or erroneous. I have honestly expressed the results of my own labours, regardless of the praise or disapprobation they may meet with, and confident that if my conceptions are truthful and accurate they will stand the tests of examination and discussion.

My first paper on the *Tineina* will appear some time during this month in the Proceedings of the Academy of Natural Sciences. In it I describe four genera, and give figures of the heads, wings, &c., like those in your "Insecta Britannica." I know nothing of the primary states of two of these genera, and as the perfect insects are quite distinct in their characters from any genus described in your work I have pronounced them to be new.

The plan on which the publication of the Proceedings is conducted does not include illustration, except at the expense of the author; therefore I will not continue these papers with plates beyond another number or two in the Proceedings, and if I cannot induce Prof. Henry of the Smithsonian to continue them, as I work up the material in my collection, I will cease to publish them.

The article to which I referred in my last as being ready for distribution by the Smithsonian Institution has been printed in the Annual Report, but has not been distributed, owing to the want of franks. When I receive copies of it I will send you one.*

* See *ante*, p. 18. H. T. S.

One of the most interesting species amongst the cocoons I sent to you will doubtless be *Phyllocnistis vitigenella*. The larva mines the leaves of *Vitis cordifolia* in an exceedingly long, winding, narrow tract, just sufficiently broad to accommodate its body. The tract is not transparent, and the entire parenchyma of the leaf is not consumed, so that in appearance it is not unlike the tracings left by snails. Just before undergoing its transformation the larva enlarges its mine sufficiently to enable it to throw the leaf into a small fold and weave its cocoon.

The larva is without feet or prolegs. The body tapers posteriorly somewhat, with the sides of the segments slightly projecting, but flattened, and the middle cylindrically elevated. The head is thin, flat and circular, with the mandibles forming an appendage in front in the median line. The head is umbre-brown. The body shining, translucent, whitish on the sides and dark green in the middle. It is somewhat viscid, adhering to whatever touches it after the larva is taken from the mine. When this is done, it makes little or no voluntary movement and does not retreat in its mine when touched. The larva is apparently very delicate and is easily killed,—indeed, does not survive the gentlest handling and examination.

All the specimens I found in the larva state produced perfect insects some time past, but, fortunately, the day before I sent the box to you I found four or five mines, the larvæ in which were just preparing for pupation. I secured these for you, and as soon as I was sure they had begun to weave I packed them in the box. When they appear I think you will find I have not mistaken the genus.

In the leaf of the same plant (*V. cordifolia*) I found, a few weeks since, another *Antispila* larva, another much larger one in a species of domestic grape (the *Isabella*), another in a species of *Cornus*, and on the day I went out for your benefit still another species in the leaf of the Hickory.* So

* *Carya*, a genus of *Juglandaceæ*. H. T. S.

you perceive I was rewarded for my kind intentions to you, by Nature herself, and I know no one whom she could more properly adopt as her *protégé*. I intended to send you specimens of these, although I have but few of each, but I was much pressed for time when preparing the box and overlooked them.

Aspidisca splendoriferella is a genus very close to *Antispila*. The mine of the larva is similar but much smaller, and although the cocoon is very small, but little of the mine is left after the membranes of the leaf are cut. It feeds on the leaf of *Cratægus tomentosa*.

The larva. The head is much smaller than the first segment, rounded above and elliptical. The body is flattened and tapers from the anterior rings, but the first is smaller than the second ring. The segments are rather deeply incised, the thoracic obtusely rounded at the sides and the remainder, each with a lateral nodule or mammilla. Without legs or prolegs, but on the second and third thoracic rings, *both on the ventral and dorsal surfaces*, are spots or cup-like depressions, two on each ring, capable of being contracted and expanded; so also, from the sixth to the ninth inclusive on the ventral surface, are oval central spots of a similar kind, one on each ring, and on the ring next the last is a protuberance both dorsal and ventral, with *two* cup-like depressions on each surface. These are not supplied with hooks, and if they are substitutes for feet must act like *suckers*. These cup-like depressions are pale brown; the head dark brown; the body brown, with blackish along the dorsal and ventral surfaces.

The mine is a small transparent blotch, but little larger than what is sufficient to form the disk, with the "frass" deposited collectively. The disk is oval, rather pointed at the extremities, and is secured to some object by one of its ends tied down on a little white silk button. The larva carries the disk quite a distance sometimes before finally securing it.

As the perfect insect is very small I will give you its

characters, and beg, when your specimens appear, that you will verify my diagnosis.

Head smooth (with a cap of curved scales overarching the vertex from behind; this may be owing to the pinning), with the scales of clypeus somewhat produced into a point beneath. Ocelli none. Forehead or vertex rounded. Eyes very small, not visible from above and scarcely visible in front. Antennæ held extended laterally, very short, scarcely one half as long as the fore-wings and about twice the length of the head; rather thick, obtuse, with diameter equal, roughened with scales. Maxillary palpi none. Labial palpi none. Tongue none.

I supposed at first this insect must belong to *Tinagma*, but it differs from it in the neuration of the wings, in ornamentation, and in its characters as given above. The perfect insect is very beautiful. I will not describe it, although your specimens will not appear until next spring.

I send you a leaf of *Ostrya Virginica*, containing what to me is a novel mine. I found it for the first time a few days ago, when looking for cocoons intended for you. I should be glad to learn whether you know of any larva having a similar habit. The mine begins along the midrib, and scarcely ever exceeds the limit of the two veins, between which it is first commenced. Its peculiarity consists in the construction of lateral walls of "frass"

within the mine, that are extended as the mine increases in length, forming a tube, transparent above and below, which leads to an opaque one alongside of the mid-rib of the leaf.* When the larva is alarmed or disturbed it retreats along this way and conceals itself under the opaque portion along the mid-rib. It quits the leaf to transform, and weaves a little ovoid cocoon.

I sent you a *Lithocolletis* which mines this leaf also, and there is still another species in it, which had not become pupæ at that time, whose cocoon is a little ovoid mass formed of "frass."

I have found other tube-forming larvæ, that construct their tubes on the *outside* of leaves. One of these is very singular, its tube being two or three inches in length, and covered at the large extremity by a web of silk, under which the larva feeds. I have two cocoons of this larva which I hope will produce imagos. It is rather rare in this locality, but two years ago I found it very abundant in the oaks of Minnesota near Saint Paul. I did not succeed in getting pupæ at that time, and I think Pennsylvania is probably its southern limit.

I am much obliged for the kind invitation you have given me to consult you, whenever I find myself in difficulty. There are a great many questions I should like to ask, but I know how valuable is your time, and feel sure much of it is devoted to the incipient Entomologists of your own country. Then, too, I have been taught, from my youth, in the words of the homely adage, that "those who help themselves, God helps."

Is there a genus in the family *Elachistidæ*, the larva of which form their cocoons in a thin open net-work, so that the pupa is visible? I found larvæ which made cocoons of this kind feeding on the drupes of the fruit-heads of sumach.

I am quite sure I have found a new genus in *Lyonetidæ*. I am acquainted, however, only with the imago. Are there

* Nothing at all analogous to this is known amongst the mining Lepidopterous larvæ of Europe. H. T. S.

any other genera in this group besides those you have so well described? Besides this I have made drawings and descriptions of many other novelties, of which you will hear in due time. Please do not forget to send me the diagnoses of the new genera you may describe.

VII.

EASTON, *February 16th*, 1860.

As I am compelled to leave home on a visit to Virginia to-morrow, to be absent perhaps for some time, I send in the post which will bring to you this note, three papers on *Tineina*, and hope they will prove of some interest to you. You will find also enclosed herewith, some photographic copies of some of my drawings referred to in the first paper,* together with a sheet on which I have traced some heads of other genera and copies of the wing structure of others.† This will enable you to make more satisfactory comparisons, particularly in those groups which I have designated as new ones. By it you will perceive that the genus *Aspidisca* is quite as nearly related to *Cemiostoma* as to *Tinagma*. The genus I have described ought to carry with it in a systematic arrangement that of *Antispila*, and thus you perceive how much we are at variance respecting its position. I have no hesitation in saying that I regard the position of the genera *Perittia*, *Tinagma* and *Douglasia* in the family *Glyphipterygidæ* as too anomalous to be correct, and think that a revision of these genera and a comparison with those alluded to previously would induce you to throw them together in a new group, with some of the genera included under *Lyonetidæ*. I have recognized some of our *Tineina* as belonging to the

* This will be found introduced at the end of the first published paper, reprinted from the "Proceedings of the Academy of Natural Sciences," Sept., 1852. The figures, though referred to there at p. 262, were not published. H. T. S.

† These I have introduced under the notices of the respective genera, which they illustrate. H. T. S.

former family, but have not yet fully satisfied my mind, that they do *not* belong to *Glyphipteryx*, and hence have not yet described them, but certainly they are too markedly different from *Antispila* to admit of inclusion in the same family group, even under my own views.

In the photographic copies of my sketches you will find the details of structure of a new genus, *Anorthosia*, which I have not yet published.* I send it because I regard it as very curious in the structure of its labial palpi, and as it was upon the same sheet containing the others. I intended to give illustrations of all the new genera I might describe in the papers I send, but I found that the expense was altogether too great, for our American engravers are exorbitant in their charges. . . . . Hence I do not send you the artist's plate, but my own drawings. As I am my own delineator, the work of course consumes much of my time, and recently I have ceased to delineate the heads. I am now sorry that I have made no representation of *B.*? *Staintoniella*, *Bucculatrix*? *coronatella*; *Eudarcia*, *Diachorisia*, or *Cosmiotes* or *Aspidisca*, because they are all small and difficult to delineate.

I send you two copies of each of my papers, and beg you will have the kindness to present one of each, with my compliments, to Professor Zeller. You are doubtless in frequent communication with him, and as he has described quite a number of American *Tineina* (however, I have never seen the descriptions), he may recognize in my descriptions some previously published by himself. Please say to him, that if he can send me, without inconvenience to himself, his descriptions of our *Tineina*, I shall look upon his kindness as a great favour. And must beg both you and himself not to forget, that in the recognition of genera in such an immense field as our country presents, with no guide but books treating of foreign fauna, I labour under many difficulties.

Professor Agassiz, however, has interested himself in my

* Described in the Proc. Acad. Nat. Sci. Phil. May, 1860. H. T. S.

studies most kindly, and will supply me with a suite of specimens, which will be received from agents in Europe in a few months, including all the European genera. When I receive these the work will be easier and more certain.

I was very sorry to hear my box of cocoonets disappointed you in not producing specimens. And I thought I was careful to designate *Robiniella* and *Vitigenella* as those which would appear in the fall. The specimens of *Aspidisca*, which will be most interesting to you, will appear notwithstanding they are kept in a warmed room; at least, the only specimens I have appeared last spring under these circumstances.

I have not seen the "Intelligencer" since December 3rd, and cannot imagine why it is delayed. Could I not make arrangements at the publishing office, after subscribing through Baillière, to have it sent me directly?

Your use of my remarks on species* in the Synopsis was a most unlooked-for compliment and a most pleasant recognition of the views advocated, which a perusal of Darwin has not disturbed.

I am writing in much haste . . . .

VIII.

EASTON, PENNSYLVANIA, UNITED STATES,
June 23rd, 1860.

ENCLOSED in my fourth paper, on American *Tineina*, which I send by the present post, I have taken the liberty of sending a photograph of myself for which I sat a few months ago. May I beg you to receive it as a token of my esteem and friendship, sent to you in the hope that it may dissipate to a certain extent that sense of vagueness, which must be connected with my personalty whenever I may be recalled to your mind? Need I say how much I should be pleased to possess a like memorial of yourself, to hang amongst those of other friends in my study. If you can send me one without

* Quoted in the "Entomologist's Annual" for 1860, pp. 156–168. H. T. S.

any inconvenience, or without having it taken for this purpose alone, it will give me much pleasure.

I was very glad to hear you had succeeded in breeding *A. splendoriferella*, and am pleased that the species is so interesting in your view.

In return I have an announcement to make which I think will somewhat surprise you. I have at last succeeded in breeding a *Nepticula*, and the species is so very like your *Angulifasciella*, both in ornamentation, as given in Vol. I. of the "Nat. Hist. of the Tineina," and in its preparatory states, that I am much inclined to believe it the same insect. Indeed my feeling in this respect amounts almost to a conviction, and yet I have named it *Rubifoliella* from its food plant, merely, however, because at the time I described it I had but a single specimen. Since that time another imago has made its appearance. During the present season I will make special search for it and hope to secure specimens in the pupa state for you. You will find the entire history of the species detailed in a paper which I will send to you in July. I enclose in this note a rough sketch of the neuration of the species, in which you will notice that the discoidal cell of the fore-wings is closed by a faint nervure near the base. Will you please inform me whether in *Angulifasciella* this peculiarity exists? Should these insects prove to be the same, will it not be a very interesting fact in geographical distribution? At least it appears so to my mind when I consider its minuteness and the oceanic interval which separates us from England or the continent of Europe.

I have been greatly interested in Mr. Darwin's theory of the origin of species, and Dr. Hooker's introductory essay to the Tasmanian Flora. I cannot but admire the boldness of the former and the apparent candour with which he urges his views; but whilst he succeeds in jostling rudely ordinarily received views, and engendering doubts from his ingenious reasoning, he does not leave on the mind a sense of conviction. This theory of profitable modifications of structure resulting

from a struggle for existence adds nothing to our knowledge, and is flatly contradicted by all our physiological facts. It is really a revival of the doctrine of Von Bär enunciated nearly fifty years ago, "*That heterogeneous or special structure arises out of one more homogeneous or general, and this by means of gradual change.*" This united to the doctrine of transmutation puts us in possession of the entire Darwinian theory.

Prof. Agassiz is now writing a reply to his argument, and in this, all that can be urged in favour of immutability will be ably advocated and represented. Even if the theory of the immutability of species must be abandoned, from the accumulation of testimony against it, there is still, in my own view, a safe and reasonable intermediate position which can be occupied. This I conceive is indicated in the proposition of Dr. Le Conte as contained in my introductory remarks in the Synopsis of the N. A. *Sphingidæ*.

I have been preparing to write a Monograph of the American *Tineina*, but greatly to my regret I must defer the commencement of the work for at least another year. All the material that is accumulated results from my own industry, and thus far my captures have been almost purely local. At the end of this season I shall be able to determine how much and what kind of assistance I shall receive from others. A few students and collectors are collecting for me at present in various parts of the country, but the region thus occupied is not by any means sufficiently extensive. They are all north of 38° N. latitude, and all my efforts are now devoted to obtaining collections south of this, or in the extreme southern states, but thus far without any success.

It may interest you to know that I have constructed a Synoptical Table of all the British Genera of the *Tineina*, including those groups which I have described as new ones, and carried it out rigidly on the basis of structural characters. I have done this chiefly for my own convenience, but with the intention likewise of using it in a monograph of our own

insects, after having tested its value in my own studies. All the groups are rigidly exclusive, and you would be gratified, I think, could you see how much systemization is facilitated by the use of it, however much you might object to the principal groups which are formed in it. I will give these, and they will indicate, at the same time, my conceptions respecting classification. The future study of our fauna may, however, modify my conceptions, but I cannot here specify in what particulars.

In the first place, then, I am much inclined to include the *Tortrices* in the group TINEINA, as one of its family groups. I will not detail here my reasons for this, but of one thing I am certainly convinced, that Mr. Wilkinson's division of the group into families, representing I suppose the European practice in this respect, is purely artificial and unmeaning in so far as any definite conception is connected with them. They are merely convenient groupings of genera intended to facilitate the recognition of these groups. This object can be attained in a manner less objectionable.

With respect to the *Tineina* proper, to give you a tabular statement of my ideas, I would arrange the group in the following manner; but I ought to premise that this is merely an abstract of the principal groups in the Table, and they are not as distinctly characterized as they are there.

TINEIDÆ. Hind-wings rather broad, frequently somewhat narrow and ovate-lanceolate, *never linear-lanceolate.*

Group. I. *Micropterigides.* Neuration of both wings nearly alike.

Group II. *Tineides.* Median vein of h. w. two-branched; subcostal simple or bifid; discal nervules two or three, distinct; often rather narrow and ovate-lanceolate.

Group. III. *Gelechides.* Median of hind-wings three-branched; very frequently the *medio-posterior* and *central* nervules are placed on a common stalk; subcostal simple or bifid; discal nervules are two, one or none.

Sub-Fam. *Gracilarinæ*. Hind-wings extremely narrow, setiform or linear-lanceolate.

Group I. *Gracilarides*. Hind-wings with median vein two or three-branched; cell most frequently open, &c.

Group II. *Lithocolletides*. Hind-wings with median vein always simple; cell always open.

These groups are subdivided into subordinate groups by means of the most general characters, and these again into others, until at last they are cut up in small groups of genera, which are distinguished from each other by their special and peculiar characters. Thus those which most nearly approach each other in structure are brought into direct contrast, except when they happen to be separated by some category having a general significance. You will not approve this arrangement, but I find it is so convenient and serviceable that I cannot but believe it will be valuable and useful to others. In the present state of Lepidopterology the attempt to construct a natural system must be purely approximative. I should be glad to submit the entire Synopsis of Genera to your inspection, did it not take up too much space to send in MS.

I have been greatly disappointed this spring in the failure of some of my most interesting pupæ to produce imagos. This was the case with the pupa from the larva which made the peculiar mine in the leaf of *Ostrya** sent to you last fall, and the tube-making larvæ on the lower surface of the oak leaf. I found however a *Butalis* larva. It mines the leaves of *Aster cordifolia* in rather a peculiar manner. The lower surface of the leaf, near the base, is covered with a web containing silken tubes, and the larvæ open mines connected with these, and they are rarely extended to a greater length than that of the body of the miner. They are easily alarmed and immediately retreat from the mine to the web, where they are almost concealed.

In November, 1858, I found two cases of, I suppose, *Coleophora* larvæ, spun up on the slots of the window-

* See p. 27. H. T. S.

shutters to an outhouse. The cases are cylindrical, about two lines long, and the free end is closed like a three-sided pyramid, while the mouth is slightly curved. I allude to them here because, a few days ago, I removed the cases from the glass tube in which they have been since I first found them, with the intention of opening them to ascertain what they contained. Much to my surprise I found the larvæ in both were living, before I succeeded in opening the cases, which appear to consist of tough silk. As no imagos appeared during last summer, I supposed the larvæ were dead, and I am astonished that they should be living now after having passed nineteen months in the larva state without food.

My published generic diagnosis of *Aspidisca* is erroneous in one or two particulars. The two specimens from which this was drawn were not well set, and I suppose I must have injured the oral parts in my microscopic examinations. I have corrected these errors in my last paper, the fifth, now in press. The correction is, that the labial palpi are extremely short and slender, much separated. Tongue naked, and scarcely as long as the anterior coxæ.

The miner in the leaf of Hickory of which I spoke in one of my previous letters is not an *Antispila* as I supposed, but another species of *Aspidisca* very like *Splendoriferella*, yet specifically distinct.

If there are any species I have described you would like to examine or to possess specimens of, I will send them to you, if you will specify them, in August, through the Smithsonian Institution. I cannot promise, however, to send specimens of all the *Tineina* I have described, for frequently the descriptions have been drawn from a single specimen which has been deprived of one pair of wings.

* * * * * * * *

Yesterday I found the ♂ of *Anarsia ? pruniella;* it is the same as the European, and the genus is no longer questionable.

N. American *Tineina* for Mr. H. T. Stainton of Mountsfield, Lewisham, London, S.E., from Brackenridge Clemens of Easton, Pennsylvania, U. S.

1. *Tinea biflavimaculella* (2).
2. „ *dorsistrigella* (3).
3. „ *lanariella* (4).
4. „ *nubilipennella* (3).
5. *Xylesthia pruniramiella* (2).
6. *Amydria effrenatella* (1), very rare.
7. *Anaphora plumifrontella* (3).
8. *Lithocolletis lucidicostella* (4).
9. „ *Desmodiella* (3).
10. „ *basistrigella* (3).
11. „ *luceticlla* (5).
12. *Tischeria citrinipennella* (1).
13. *Lithocolletis argentifimbriella* (1).
14. *Phyllocnistis vitigenella* (2).
15. *Plutella vigilaciella* (1).
16. „ *limbipennella* (2).
17. *Argyresthia Oreasella* (1).
18. *Bedellia ? Staintoniella* (3).
19. *Coleophora coruscipennella* (5).
20. *Cosmopteryx gemmiferella* (6).
21. *Aspidisca splendoriferella* (4).
22. *Gelechia Agrimoniella* (6).
23. „ *Rhoifructella* (3).
24. „ ? *rubidella* (3).
25. „ ? *roscosuffusella* (3).
26. „ ? *detersella* (2).
27. *Butalis matutella* (7).
28. „ *flavifrontella* (1).
29. *Stilbosis tesquella* (3).
30. *Strobisia iridipennella* (3).
31. „ *emblemella* (3).
32. *Chrysocorys Erythriella* (2).
33. *Brenthia pavonacella* (4).
34. *Pigritia laticapitella* (2).

35. *Anorthosia punctipennella* (2).

Phycites.

36. *Lanthaphe Plantanella* (2), one specimen, much mutilated for examination. Both males.

I should have been glad to have made the list of species more extensive, but cannot do so at present.

July 23, 1860. B. C.

[My remarks on the above series of North American *Tineina* were published by Dr. Clemens in the Proceedings of the Academy of Natural Sciences of Philadelphia, for October, 1860, pp. 433, 434, and also in the second volume of the Proceedings of the Entomological Society of Philadelphia, vol. 2, pp. 130—132. I quote here from the first named work, which contains some introductory sentences by Dr. Clemens, omitted in the Proceedings of the Entomological Society. H. T. S.]

Extracted from the Proceedings of the Academy of Natural Sciences of Philadelphia, October, 1860, p. 433-4.

OBSERVATIONS ON AMERICAN TINEINA, BY H. T. STAINTON OF LONDON.

[Mr. STAINTON has very kindly sent me the following observations, on a small lot of American *Tineina*, forwarded to him late in July. In return, I am indebted to him for an interesting suite of European genera and specimens of those insects, which he considers identical with ours. It is quite needless for me to say that I regard any opinion Mr. Stainton may deliberately form, on questions of classification, to be final.*

After having examined a specimen of the genus *Simaëthis*, I must acknowledge that *Brenthia* seems congeneric with it. Whether the former genus naturally belongs to the *Pyralidina* must be left for future determination. My own opinion at present is, that it is improperly included in this well-marked group.

BRACKENRIDGE CLEMENS.]

Tinea biflavimaculella. This is closely allied if not identical with *T. spilotella* (see Linn. Ent. vi. p. 108, *Rusticella*, var. b.). *Spilotella* appears confined to the north of Europe, occurring in Finland and Scotland.

T. dorsistrigella is allied to *T. ferruginella*, but the markings are much whiter and the dorsal streak is broader.

* I need scarcely say that I do not share Dr. Clemens' notions of my being always right. "*Humanum est errare.*" H. T. S.

T. nubilipennella is identical with our *T. fuscipunctella*.

T. lanariella is identical with our everywhere abundant *T. biselliella*.

Xylesthia pruniramiella. This curious genus appears to be rather allied to *Ochsenheimeria;* another strange genus in this vicinity, *Hapsifera*, was founded by Zeller in the Isis of 1847, p. 32.

Amydria effrenatella. I am disposed to place this in the genus *Euplocamus;* the palpi are very like those of *E. tessulatella*, Z. (Linn. Ent. vi. p. 96). (This is true of the labial palpi; but the maxillary palpi in *Amydria* are extremely short. B. C.).

Anaphora plumifrontella. I am utterly perplexed with this: we have no European form at all resembling it.

Lithocolletis lucidicostella.
L. argentifimbriella.
} These are nearly allied to the group of *Cramerella*, *Tenella* and *Heegeriella*.

L. basistrigella. This is nearly allied to a south European species, *Suberifoliella* (Zell. Entomol. Zeitung, 1850, p. 208); but it is smaller, the basal streak is shorter, the subapical streaks are more distinct and the ground colour darker.

Tischeria citrinipennella. This is rather intermediate between our European *Complanella* and *Marginea;* it possesses a black spot at the anal angle, as in the last-named species.

Phyllocnistis vitigenella. This is closely allied to our *Suffusella* and *Saligna;* but it is smaller, and the position of the subapical dorsal streak is different.

Coleophora coruscipennella. This is very nearly allied to our *C. Fabriciella;* but the anterior wings are a little browner. The antennæ quite agree with those of *Fabriciella*.

Plutella vigilaciella. This is our *P. porrectella;* you will find the larva in gardens on *Hesperis matronalis*.

Plutella limbipennella. This is our *P. cruciferarum;* it seems cosmopolitan, as I have seen specimens from various parts of the globe. Probably wherever man eats cabbages *Cruciferarum* will occur.

Argyresthia oreasella. This seems quite identical with our *A. Andereggiella*.

Bedellia? Staintoniella. Certainly a *Bedellia*, and I cannot distinguish it specifically from our *Somnulentella*, only it is smaller.

Cosmopteryx? gemmiferella. A true *Cosmopteryx;* but your specimens are not all the same species; four of them I take to be the true *Gemmiferella*. These have the central fascia *reddish*-orange, edged with silvery violet. This fascia *is considerably broadest on the costa*, its hinder margin being formed by two silvery-violet spots, which are by no means opposite; at the apex of the wing is a short silvery-white scale [streak?], preceded by a violet-silvery spot, *with which it is not connected*.

The other two specimens, for which I propose the name *Cosmopteryx Clemensella*, differ from *Gemmiferella* in the anterior wings being darker, the orange fascia is paler, not so reddish; its margins are pale golden, instead of silvery-violet, and its hind margin is almost straight (this is very different from *Gemmiferella*); finally, the apical streak is continuous, not interrupted, and of a silvery-white throughout. I shall describe this in an early number of the "Intelligencer," in some remarks on the extra-European species of the genus *Cosmopteryx*.*

Anorthosia punctipennella. This seems to be allied to *Cleodora*, and I do not feel confident that it is generically distinct.

Gelechia agrimoniella. Allied to *G. ligulella* and *G. tæniolella* but quite distinct.

G.? roseosuffusella; a true *Gelechia*, allied to *G. decurtella* (H.-S. Tineides, tab. 72, f. 539).

G. Rhoifructella. This has considerable resemblance with our *Populella;* but the anterior wings are broader and blunter, and the anterior segments of the body are not pale.

G.? rubidella. A true *Gelechia*, somewhat allied to *G. ericinella*, but smaller, and the anterior wings narrower.

G. detersella. I am uncertain about this; it is perhaps allied to our moss-feeding *G. affinis.* The name *detersella* must be altered, that name having been used by Zeller for a Sicilian species of the genus (Isis, 1847).

The genus *Gelechia*, as at present constituted, is very elastic and includes a variety of slightly different forms. *G. subocellea* is our most discordant species.

Strobisia iridipennella.
S. emblemella.

These are very different from anything in Europe, and the form of the wing in *Iridipennella* is so peculiar that you are clearly justified in forming a new genus; it is not improbably a connecting link between *Gelechia* and *Glyphipteryx*.

Butalis flavifrontella.
B. matutella.

Zeller has described, in the "Linnæa Entomologica," vol. x., several North American species of *Butalis.* His *Basilaris*, p. 230, is perhaps identical with your *Flavifrontella*, and his *Impositella*, p. 241, may have been described from a worn specimen of your *Matutella*.

Stilbosis tesquella. This is a very curious insect, resembling in form of wing *Asychna æratella;* the ornamentation is more like that of some of the *Lavernæ*.

Chrysocorys Erythriella. This is a true *Chrysocorys.*

* "Intelligencer," vol. ix. p. 31 (Oct. 27th, 1860).

Brenthia pavonacella. I am disposed to consider this not a TINEINA, but rather one of the PYRALIDINA, allied to *Simaëthis;* but I have never observed the strutting habit in any of our species.

Pigritia laticapitella. This is an obscure looking insect of doubtful location, reminding one most strongly of some of the aberrant *Butalidæ.*

IX. (AND LAST).

EASTON, PENNSYLVANIA, UNITED STATES,
October 29th, 1860.

YOUR very kind letter of the 26th of September was received only a few days after the deaths of a lovely and accomplished sister, and my father-in-law, whom I greatly respected and loved.

This latter event will interrupt my studies during the winter, I fear, as it has left me to settle the affairs of a large and complicated estate. Together with other duties it may absorb my entire time, for there are indications, not insignificant, of a coming commercial crisis, consequent on the domestic agitation of the slavery question.

The box containing the insects reached me the day after your letter. Its contents were entirely uninjured, and I cannot sufficiently thank you for the generosity you have shown, as I expected nothing in return when my box was sent to you. I should have written on the reception of your letter announcing the safe arrival of my box, that the report of your examination of the American species would amply repay me, if you connected with the act any obligation, for the specimens sent to you. The sickness of those who were very dear to me determined me to defer writing from day to day until I entirely forgot to do so.

I was much interested in your observations, which confirm in some instances what I could only suspect, having no European specimens for comparison. I have sent a copy of your remarks to the "Proceedings" for publication this month, but have not yet received copies. I agree with you

entirely, that *Brenthia* is very like the genus *Simaëthis*. These genera doubtless belong to the same group. I cannot perceive, however, why *Simaëthis* is placed in the group PYRALIDINA, and cannot imagine what considerations have governed European systematists in determining this to be the natural and proper place for the genus.

After having attentively examined the specimens of *N. angulifasciella*, which you sent me, and comparing them with those of *N. rubifoliella* in my possession, I do not believe the two insects to be distinct. The structure of the wings is the same in both; in each there is a *closed discoidal cell* near the base of the wing, thus differing from your delineations of the wing structure of the genus in Insect. Brit. The silvery fascia of the fore-wings has less tendency to be interrupted in the middle in *Rubifoliella*, and is somewhat more curved towards the base of the wing; and the only distinction I can perceive between them is, that the cilia of the fore-wings in *Rubifoliella* are *less white*, or rather I should say not whitish, and that it is at least one-third smaller than *Angulifasciella*. I have failed to meet with our larva this year, and indeed during the fall month, in which I expected to find it, have been unable to look for it.

In July last I found a single specimen of an imago belonging to the genus *Opostega*. It differs structurally in no respect from the European species of this genus; its ornamentation is very simple, the entire insect being silvery white, with a minute black dot at the extreme apex of the fore-wings. I have not yet published a description of it, but have named it *O. Napœella*. It may possibly be identical with or approach closely some of your species.

My time has been so occupied during this season that the number of observations I have been able to make on larvæ has been very small and unimportant.

A few days ago, however, I found on oak a case-bearing larva that puzzles me. I am undecided whether it is a Coleophorous or Coleopterous insect. It does not mine the leaf, but feeds on the under surface, leaving the net-work of

veins exposed. The case is black and hard, seeming to be formed of "frass" woven together solidly with silk. The form is also peculiar; it is nearly conical, and resembles somewhat a beetle as it is fixed on a leaf; behind there is a short tail or projection turned downwards; the mouth is large; and the larva has *remarkably long legs*. The case seems to have been formed by successive additions of the matter of which it is composed, and its length is only two lines. On the approach of cold weather the larva with its case falls to the ground. What is it? a Coleopterous insect?*

A friend has secured for me a small number of *Tineina* from Labrador, where he spent a portion of the summer. I have not, however, yet received them from him. Another collection, which I have not yet examined, has been sent to me by the secretary of the Agricultural Bureau of Massachusetts.

A week or two before receiving your last letter, I received one from Dr. Herrich-Schäffer. After referring to my labours in an encouraging way, he proposed that I should publish my new genera in his Novæ Spec. Lepid. Exot., and desired me to send specimens of them for delineation in a plate which he would give occasionally, at the same time assuring me he would return their full value in European genera. But as this would interfere with my intention of making a Monograph of the *Tineina* at some future day, I shall decline the offer.

Before the opening of the next season, I hope to send you another box of our *Tineina*, and in it I will endeavour to include as many of the new genera I have described as possible. Remember that I do not think you are under any obligation whatever to make a return in European specimens. Your remarks, if you will be kind enough to make any on the species I may send, will amply repay me for the specimens.

* I *now* think this larva would probably be referable to the Coleopterous genus *Clythra*. H. T. S.

I ought to say, without meaning however to be complimentary, that I have derived the greatest pleasure from the study of your volume of "Insecta Britannica." It is, indeed, the only entomological work of which I can say as much, and on this account alone, I feel no little friendship for the student who has led me so skilfully through the complicated mazes that exist in the group of beings of which it treats. In the account of pleasure received I am still largely your debtor.

With this note I have likewise posted a paper on our *Tortricidæ*. I fear you will not like it, especially the concluding remarks. Permit me to call your attention particularly to the new genus *Dysodia*, p. 349. . . . . .

[This was the last I ever heard from Brackenridge Clemens. I had thought his attention had been entirely diverted from Entomology, and was agreeably surprised sometime afterwards to find a series of papers from his pen in the Proceedings of the Entomological Society of Philadelphia for 1861 and 1862; the sight of these papers led to my writing him a letter on the 24th May, 1863, but to that letter I received no reply. I subjoin a copy of that letter. H. T. S.]

Copy of my Letter to Dr. Clemens, dated May 24th, 1863.

I HAVE just been reading with much pleasure your papers on American *Tineina* in the Proceedings of the Ent. Soc. of Philadelphia for November and December, 1861, for January and February, 1862, and for March and April, 1862.

Till I met with these papers I had thought that your Entomological activity had been checked, and I am delighted to find that such is not the case, but that so many new observations have been made.

From the mode of feeding of the genus *Catastega*, which you describe at p. 86, I should think that your suspicion that they may belong to the *Phycideæ* is probably correct.

I trust that your calendar of these larvæ, with the indications you have given, will prove serviceable in inducing fellow labourers to work at the same group.

I believe I must plead guilty to not having yet replied to your letter of the 29th October, 1860, nor thanked you for your paper on the *Tortricidæ*, sent at the same time.

In that letter you held out an expectation, that before the opening of the next season, you hoped to send another box of *Tincina*, and I fear that I was waiting for this before replying to your letter.

I do not know whether you have any more papers in the Proceedings of the Academy of Natural Sciences. I should like to have the whole series complete before I get them bound, and I should like a copy of my own remarks which you say you had sent to the Proceedings for publication.

With reference to your *Nep. rubifoliella*, it will interest you that a species allied to *Angulifasciella* has been bred in Europe from the bramble, and Dr. Wocke has described it under the name of *N. rubivora*. I am not, however, well acquainted with its distinctive characters.

I was much pleased to hear that you had met with a species of the interesting genus *Opostega;* we are still without any clue to the habits of the larvæ of that genus.*

"The case-bearing larva on oak leaves, feeding on the underside, leaving the net-work of veins exposed, with remarkably long legs"—you have probably bred by this time; it is perhaps your *Coleophora querciella*,† but I have never myself observed any long-legged *Coleophora* larvæ, though amongst some of the case-bearing larvæ of the genera *Tinea* and *Solenobia* I have noticed larvæ with legs of unusual length.

Have you yet met with any larvæ of the strange genus *Micropteryx?* I enclose you a birch leaf, with a mine of that genus; the great characteristic is the linear excrement. I also enclose an alder leaf with mine of *Tinagma resplendellum*. Looking at the blotch only it is very like a mine of the genus *Antispila*, only that the *Tinagma* larva passes the greater part of its life in burrowing down the mid-rib and back again before it commences its blotch, which is sometimes scarcely larger than the oval case it cuts out. It is not an easy species to breed, and it is very difficult to find leaves with the larvæ in them.

Though I have been so long without writing I have thought of you constantly. I shall always be happy to hear from you, and to assist you in any of your perplexities, as far as lies in my power.

I have lately returned from a six weeks visit to Italy, where I was much interested with the configuration of the country and the more southern Flora, so different from anything I had seen in my previous travels. I was too early in the season to do much in Entomology, but met with an unknown *Lithocolletis* larva near Florence, though they were too young to rear; unless it is the larva of *L. leucographella* it is probably a new species.

* That very season Dr. Schleich, of Stettin, bred a crippled *Opostega auritella* from a larva mining the flower stem of *Caltha palustris*, but has not again met with it. H. T. S.

† See note, p. 43. H. T. S.

The number of workers at Micro-larvæ in Europe has much increased of late years, and I hope soon to have active correspondents in the south of France and at Vienna, from both which localities there is doubtless yet a good crop of observations to be expected.

In Italy I fear it will be some time before we see a native Micro-Lepidopterist. Entomologists are far from numerous in Italy, and I do not know of a single first-rate collection of *Macro-Lepidoptera* there.

I observe you are in correspondence with Mr. B. Walsh of Rock Island. I had heard of him from Dr. Hagen, the great Neuropterist, who seems to have a very high opinion of him, and he had recommended me to write to him on the subject of N. A. *Micro-Lepidoptera*. This I now see will not be necessary on my part as he is already in correspondence with you, and I would rather not attempt to divert the current of American captures, but let them all pass, in the first instance, through your hands.

CHAPTER II.

PAPERS CONTRIBUTED BY DR. B. CLEMENS TO THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

[Reprinted from the Proceedings of the Academy of Natural Sciences of Philadelphia, September, 1859, pp. 256—262.]

CONTRIBUTIONS TO AMERICAN ENTOMOLOGY.

BY BRACKENRIDGE CLEMENS.

TINEINA.

IT is the intention of the writer to confine these contributions to Lepidopterology, to the description of species, which are new to entomological history, or which are believed to be new. This plan dispenses with the necessity of general remarks on systematic arrangement, since but few species at a time will be given, as the genera to which they belong are determined, or ascertained to be undescribed. Indeed I have nothing of value to add to what has been recently advanced elsewhere, nor has any question arisen in my studies of the present group, that would induce me to retract or doubt the accuracy of the views advocated respecting the nature of a family. I do not wish, however, to be understood to assert that the group *Tineina* is synonymous with a family. I do not by any means entertain the belief that it includes only one, and yet I can perceive but little in the majority of the groups collected under this term, other than artificial assemblages of genera, under a family termination.

I find in the pterogostic characters of the perfect insect a similitude of structure which enables the investigator, with

but little difficulty, to refer it to the appropriate principal group formed on this basis. The individuals, thus assembled together, agree not only in *general structure*, but in embryonic histories and in larval forms, so far as my own observation and study of other fauna than our own has enabled me to determine the question. The agreement in embryonic form extends into the group *Tortricina*, and the relationship in the imago is likewise expressed to a certain degree in the neuration of the wings of this latter group as compared with that of the *Tinecina*. These characters, however, are sufficiently marked in each, and can scarcely be mistaken in either instance by one of ordinary powers of discrimination.

Without, therefore, attempting to fix at present the limits and characters of the group, more definitely than by the wing structure, and rejecting the generic values usually assigned to it, except where there is characteristic variation, we will proceed to describe generic groups and their individuals.

Tineidæ.

Imago with the nervules of the anterior wings radiating chiefly from the posterior part of the disc, with four to five *subcosto-marginal nervules*, the first of which arises near the base of the wing, with two* simple *disco-central nervules*, with the median nervure branching near its posterior extremity into three nervules *medio-superior*, *central* and *posterior*, with the submedian fold well marked, and the submedian nervure simple and usually bifid toward the base. Posterior wings with bristle, with costal nervure simple, with subcostal usually simple and attenuated toward the base of the wing, emitting a *discal nervure* from which arise *at least two disco-central nervules*, with median either bifid or trifid, with submedian fold and simple submedian nervure, and an internal fold or nervure.

* Dr. Clemens has written in pencil on the margin of my copy of this paper "or three." H. T. S.

Tinea, Fabr.

Head free, as broad as the thorax, roughly haired above and in front. Ocelli none. Eyes hemispherical and salient. Antennæ simple, filiform, in the ♂ very slightly ciliated, tapering from the base, with joints closely set and striated, not so long as the anterior wings, and scarcely as long as the body. Maxillary palpi long, folded, five-jointed. Labial palpi cylindric, scaly, the second article with bristles, *especially at the apex above;* third article small and somewhat deflexed. Tongue very short, not as long as the labial palpi. Wings exceeding the tip of the abdomen; the *anterior* oblong-ovate, with moderate apical cilia; *posterior* ovate, clothed with scales, and with long cilia behind.

The following species are represented in my collection and may be tabulated as follows:

§ A semi-pellucid discal spot on under surface of fore-wings.

† Fore-wings without a dorsal streak.

Biflavimaculella. Dark brown, tinged with violet, with a very pale yellow costo-discal patch, and one above interior angle.*

†† Fore-wings with a dorsal streak.

Dorsistrigella. Dark brown, with a costo-discal very pale yellowish patch.†

Crocicapitella. Fuscous, with a discal yellowish spot.

§§ No discal spot on under surface of fore-wings.

Carnariella. Yellow-brown, dusted with fuscous; a discal and two intermediate dark brown spots.

* I received two specimens of this from Dr. Clemens; it appears to be almost identical with *Tinea rusticella*, var. *spilotella*, Tengström. H. T. S.

† I received three specimens of this from Dr. Clemens; it appears to be a good species, allied to *T. ferruginella*, Hüb. H. T. S.

Lanariella. Pale yellowish-brown, or a silky pale yellow, with sometimes a brownish discal spot.*

Nubilipennella. Dark fuscous, dusted with dull yellowish.†

Variatella. Whitish, varied with dark brown, with white costal and dorsal spots.

Medio-superior and central nervules of fore-wings arise on a common stalk; last branch of subcostal bifid.

T. biflavimaculella.‡ Palpi pale yellowish, dark brown externally; antennæ dark fuscous, darkest toward the base. Head and front luteous. Thorax dark brown. Abdomen dark grey. Fore-wings umber-brown, tinged with a violet hue, especially toward the tip, where it prevails. On the middle of costa, a pale yellow, somewhat triangular patch extended to the disc, and a dorsal patch of the same hue at the interior angle; cilia dark-coloured, dotted on the posterior margin of the wing with pale yellow. Hind-wings grey, with a bronzy hue. Exp. al. 6·50 lines.

Imago, August, September.

Medio-superior and central nervules branch from a common stalk.

T. dorsistrigella.§ Labial palpi yellowish, dark brown externally, third article yellowish. Head and front very pale yellow, tinged with dark brown on the sides above the eyes, and at base of antennæ. Antennæ dull brown. Thorax dark brown, with the disc very pale yellow. Fore-wings blackish-brown, somewhat tinged with obscure reddish, with a dorsal streak along the inner margin, whitish or pale

* I received four specimens of this from Dr. Clemens; it is our *T. biselliella*, Hummel. H. T. S.

† I received three specimens of this from Dr. Clemens; it is our *T. fuscipunctella*, Haw. H. T. S.

‡ I received two specimens of this from Dr. Clemens; it appears to be almost identical with *Tinea rusticella*, var. *spilotella*, Tengström. H. T. S.

§ I received three specimens of this from Dr. Clemens; it appears to be a good species allied to *T. ferruginella*, Hüb. H. T. S.

yellowish-white, and usually somewhat dilated above the interior angle; with a costo-discal patch of the same hue, and the costa punctated with pale yellowish atoms, which become small spots toward the apex of the wing, and on the posterior margin. Hind-wings pale brownish, with a reddish hue: cilia gray. Exp. al. 4·75 to 6·00 lines.

T. crocicapitella. Labial palpi yellowish, dark brown externally. Head and front saffron-yellow. Thorax dark fuscous, with the disc saffron-yellow. Fore-wings dark fuscous, with dispersed saffron-yellow scales, especially along the costa, with a saffron-yellow dorsal streak and a paler, nearly round, discal spot. Hind-wings pale brownish-gray. Exp. al. 4·50 to 6·50 lines.

T. carnariella. Palpi dark brown. Head and front rather dark ochreous, tinged with reddish. Fore-wings pale yellowish-brown, dusted with fuscous, especially at the costal portion of the base; with a conspicuous dark brown spot on the end of the disc, with two smaller spots of the same hue between this and the base of the wing, one about the middle of the disc, and the other beneath it in the submedian fold; fringes unicolorous and rather paler than the general hue. Hind-wings pale bluish-gray; fringes somewhat darker. Exp. al. 5·50 to 7·50 lines.

This species, perhaps, may have been heretofore described under another name;* but if it has, I have been unable to recognize it. I have two specimens only in my collection. The larvæ were found in one of my boxes of *Lepidoptera*, and had constructed cases of detached portions of the insects and the scales, united by silk. The imago appeared, one on March 13th, and the other some days subsequently.

The eggs were whitish, smooth and nearly cylindrical, but tapering slightly toward the upper end. Length about *one fourth* of a line, diameter one half the length. The *mature*

* I have not seen this insect, but suspect that it is our old friend *T. pellionella*, L. H. T. S.

larva was of a dirty white colour, with a black head and black cervical shield.

*T. lanariella.** Head ochreous. Labial palpi dark brownish. Antennæ dull fuscous. Thorax and abdomen pale yellow. Fore-wings pale yellowish-brown or pale yellow, with a silky lustre, and immaculate; sometimes slightly dusted with fuscous on the costa at the base, and with a brownish spot on the end of the disc. Hind-wings pale shining yellow, cilia the same. Exp. al. 5·50 to 6·50 lines.

I am not sure this is not a variety of the previous species, and has, perhaps, been heretofore described, as it is a very common inhabitant of houses. The larvæ feed on woollen substances, carpets, clothes, &c., of which each constructs a case. I have reared a great many in confinement, and have also found that they feed on the bodies of their dead progenitors, when the opportunity offers.

I find the egg described in my note-book as spheroidal and of large size for so small an insect; I doubt, however, the correctness of the term descriptive of the figure. The young larvæ appear after about two weeks, and do not immediately make a case. The *mature larva* is white, with a dark brown head and a cervical shield of the same hue. They reach maturity about the middle of March, and climb the sides of the walls to the ceiling of the room in which they feed, and suspend or attach their cases. The imagos of the first brood appear about the beginning of May; there is another in August and September.

T. nubilipennella.† Labial palpi yellowish, dark brownish exteriorly. Head and front dull fuscous or brownish-yellow. Antennæ dull dark brown. Thorax brownish-yellow. Fore-wings deep fuscous, sprinkled with dull yellowish, with a yellowish spot on the inner margin at the base, and the

* The four specimens I received from Dr. Clemens are all *Tinea biselliella*, Hummel. H. T. S.

† I received three specimens of this from Dr. Clemens; it is our *T. fuscipunctella*, Haw. H. T. S.

middle of the inner margin tinged with the same hue; with a deep fuscous spot at the end of the disc, and two others of the same hue rather indistinct, one in the fold beyond the middle, the other on the disc and a little posterior to it. Sometimes the dull yellowish hue prevails, freely dusted with deep fuscous and with the spots more distinct than in the darker specimens. Hind-wings bluish, shining gray, with the cilia of the same hue.

Exp. al. 5·50 to 5·60 lines.

Imago on wing in September.

Cetypeh? *T. variatella.** Palpi pale yellow, blackish externally. Head yellowish-white. Thorax gray, with tegulæ black, tipped behind with gray. Abdomen blackish. Antennæ blackish-brown. Fore-wings whitish, varied with dark brown and blackish; with a dark brown streak containing blackish scales, curving somewhat from the costa at the base to the fold; with a blackish-brown spot on the fold rather before the middle, slightly connected with one of the same hue nearer the base on the costa; with a dark brown, somewhat oblique patch about the end of the disc and one at the tip of the wing, and with the apical portion dusted with the same hue; a few white spots on the cilia of the inner margin, and on the costa *behind* the discal patch; *before* the discal patch are two well-marked white spots on the costa, the one nearest the discal patch having a blackish central dot; the inner margin, toward the base, white, varied with dark brown striæ; cilia grayish. Hind-wings dark brown, rather tinged with reddish, cilia the same.

Exp. al. 5·5 lines.

Imago on wing in September.

Xylesthia.

Head roughly haired. Ocelli none. Eyes round, visible in front. Antennæ filiform, with whorls of scales on each article, and the basal joint with a tuft of scales in front that

* This is probably *T. granella*, L. H. T. S.

conceals it, not as long as the body and about one-half as long as the fore-wings. Maxillary palpi very short, scaly and concealed beneath the labial palpi. Labial palpi cylindric, with a tuft of hair beneath, and with lateral bristles; the *third article* smooth and quite short. Tongue not quite as long as the palpi. Wings exceeding the body; the anterior oblong-ovate, *with elevated tufts of scales;* the posterior ovate, with the costa excavated at the insertion of the costal nervure.

*X. pruniramiella.** Antennæ yellowish-white. Palpi and head hoary. Thorax hoary, dusted with brownish. Abdomen dark brown. Fore-wings blackish-brown and luteous-brown, somewhat varied with whitish, with patches of elevated scales at the base and along the fold; with an indistinct whitish band crossing the middle of the disc, one nearer the base still fainter and one about the end of the disc, with a white dorsal spot at the inner angle and a whitish streak from the costa above it, with another whitish costal streak between this and the tip; a blackish spot at the tip, white-margined before; cilia brownish, white at the dorsal spot. The luteo-brownish hue usually prevails toward the tip of the wing, and sometimes the whitish markings are indistinct. Hind-wings dark brown, somewhat tinged with reddish, cilia the same. Exp. al. 6 to 6·5 lines.

The larva of this insect feeds on the woody excrescences found on the branches of the plum tree. These nodose tumours have recently attracted the fruit-grower's attention, but I am unable to say whether the larva is the cause of the disease. It does not confine its operations to the cortical portions of the node, but bores the wood likewise. I have found it associated with another much larger larva, but the imago of the only specimen I received, escaped from the vivarium before I saw it. Both pass the winter in the larval state, and may be taken in recent excrescences, during the

* Dr. Clemens sent me two specimens of this insect; it appears allied to *Ochsenheimeria* and *Hapsifera*. H. T. S.

Br. Clemens' orig. delineation. V

29.

Amydna effenatella

[illegible] [illegible], given
me by his brother
Dr. J

latter part of April or the beginning of May, and become imagos in June. The larva is dirty whitish in colour, with a brown head and shield and scarcely one-half an inch long; the larger larva is quite an inch in length, with no distinctive markings. *Pruniramiella* makes its cocoon of "frass" and silk in a gallery formed in the wood, but near the surface. The pupa has minute spines on the dorsum and is thrust from the cocoon at maturity.

The following species, I believe, forms a new genus. It is rather rare, at least I have met with the imago but few times. I know nothing of its embryonic states. In appearance the imago bears considerable resemblance to the figures of *Euplocamus Boleti* of Europe, but its generic characters separate it from the latter very distinctly.

Amydria.

Head free, as broad as the thorax, roughly haired (the hairs of the front ascending and those of the vertex inclined from each side towards the median line, or having a stelliform arrangement behind the antennæ). Ocelli none. Eyes small, hemispherical and salient. Antennæ simple in both sexes, moderately thick, with joints closely set and with whorls of scales, *one-half* as long as the fore-wings and scarcely two-thirds as long as the body. Maxillary palpi extremely small and two-jointed. Labial palpi with the *second article beneath hairy and formed like a brush;* the third slender and ascending. *Tongue wanting.* Wings narrow, much exceeding the tip of the abdomen; the anterior elliptical, cilia rather long, especially at the inner angle, giving the wing the appearance of being angulated; posterior obtusely ovate, with moderately long cilia behind.

*A. effrenatella.** Labial palpi yellowish-brown, with the

* This is printed *effrentella*, but Dr. Clemens has written in pencil that an *a* should be inserted between the *n* and the *t*. I received one specimen of this insect; it is probably an *Euplocamus;* in the structure of the palpi it comes very near to *E. tessulatella*. (See *ante*, p. 39.) H. T. S.

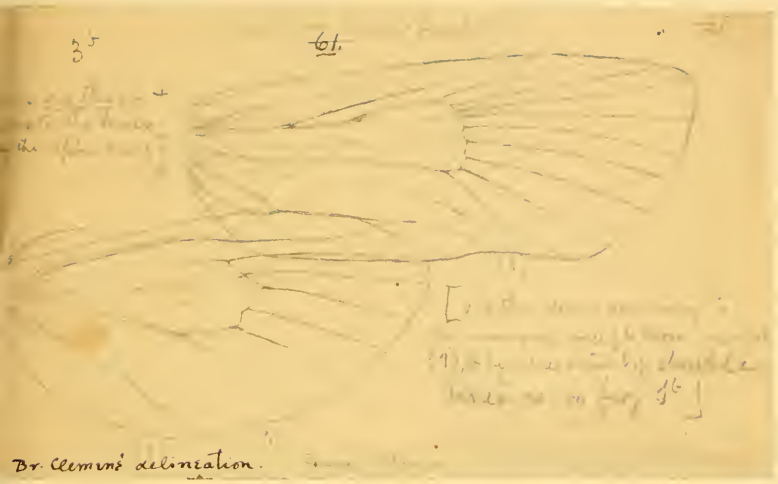
second article dark brown exteriorly. Head and front yellowish-brown. Thorax dark brown, varied with yellowish. Fore-wings fuscous, varied with yellow, which prevails along the inner margin, with fuscous spots around the apical margin, and in the ♀ a large discal fuscous patch. The fore-wings of the ♂ have more of the yellowish hue than the ♀; cilia yellowish. Hind-wings pale brownish-yellow, cilia the same. Exp. al. 8 to 11 lines.

The following species likewise form a new genus; at least, I am not aware that any has been formed into which they can be received. *Plumifrontella* is found here in June and July, when it may be taken at light. I am unacquainted with the embryonic history of the species described, and have never met with the female *Plumifrontella*. The genus, I think, belongs to the group *Exapatidæ*, and as the females in some of the genus are apterous, that of *Plumifrontella* may be unsupplied with wings. The antennæ should be examined very carefully, otherwise their peculiar structure will be overlooked and mistaken for simple filiform organs.

Anaphora.

Head hairy, concealed by the labial palpi in the ♂, free in the ♀. Ocelli none. Eyes small. Antennæ but little longer than the thorax, *serrated beneath, with the ends of the articles finely ciliated.* Maxillary palpi moderately long, scaly and three-jointed in both ♂ and ♀. Labial palpi in the ♂ * greatly developed, ascending and thrown back on the dorsum of the thorax, which they equal in length; the first article scaly, arctate and equal, to the superior margin of the eyes, and the two succeeding ones equal and furnished with abundant spreading hairs; in the ♀ short, not ascending above the eyes, articles nearly equal, the first and second hairy beneath, the third rather smooth and porrected.

* This is printed ♀ in the original, but Dr. Clemens has marked in pencil that it should be ♂. H. T. S.


3b
61.
Br. Clemins delineation.

Clemens's own outlines.
Given me by his brother Dr.

Tongue wanting. Wings exceeding the tip of the abdomen; the *anterior* with costa nearly straight, hind margin obliquely convex, inner margin nearly straight, but slightly emarginate above the interior angle; the *posterior* ovate and both with rather short cilia.

Species.

§ Fore-wings with two short dark brown streaks at the base of the fold.

Popeanella.

§§ Fore-wings with no basal streaks.

Labial palpi in the ♂ as long as thorax.

*Plumifrontella.** Rubescent, mixed with maroon-brown.

Labial palpi in the ♂ not recurved on thorax.

Arcanella. Dark brown, with a purplish hue; luteous-brown in the fold.

*A. plumifrontella.** Labial palpi reddish-brown. Thorax dull brown, tinged with reddish. Fore-wings rubescent and maroon-brown intermixed, the former hue prevailing along the fold, at the base along costa and disc, dusted with dark brown; with a dusky or dark brownish spot on the end of the disc, one about the middle of the fold and another near the base. In some specimens these spots are quite indistinct. Hind-wings dusky brown.

Exp. al. 17 lines.

Female not known.

All my specimens of the following species are much faded from exposure. The specific description will not, therefore, apply accurately to the insect as it is found in nature.

Antennæ of the ♂ distinctly serrated beneath.

A. Popeanella. Labial palpi dark brownish, whitish? at the tip in the ♀. Thorax dull brownish in the ♂, with the tegulæ tipped behind with gray; whitish? tinged with brown

* I received three specimens of this insect from Dr. Clemens; it is totally unlike any European form. H. T. S.

in the ♀. Fore-wings brownish-luteous or dull reddish-brown, with luteous or yellow along the fold and inner margin, a spot on the disc, and one on the middle of the nervules of the same hue, with a dark brown spot between them; a dark brown spot on the fold beneath the median vein, most frequently semicircular, with a short dark brown streak at the base on the submedian vein and another parallel to it beneath the median. The anterior margin striated from the costa with dark brown, with a subterminal row of dark brown spots *above the branches of the median vein*, and the ends of the nervules dotted with the same hue; cilia pale yellowish-brown. Hind-wings brownish-yellow, cilia the same. Exp. al. 12 to 18 lines.

Male and female alike.

From Smithsonian Institution. Capt. Pope's collection in Texas.

Labial palpi shorter in the ♂ than in the preceding; ascending, but not recurved.

A. arcanella. Palpi luteous-brown in front, dark brown externally. Thorax dark brown, almost blackish. Fore-wings dark brown, with an obscure purplish hue; with luteous-brown on the disc and in the fold, interrupted by a blackish-brown, nearly square, submedian spot in the fold and a small one near its base of the same hue—sometimes merely a few blackish-brown scales—with an irregular blackish-brown spot on the end of the disc, and the costa and apical portion of the wing dusted and dotted, sometimes striated with blackish-brown. Hind-wings dark brown, tinged with blackish. Exp. al. 12 lines.

Female not known.

The genera here described may be distinguished from each other by the following table:—

Head rough.

† Palpi cylindric, second joint with bristles above.

TINEA. Antennæ striated; maxillary palpi folded, five to six-jointed; tongue scarcely as long as the labial palpi; no naked space round the eyes.

†† Palpi tufted beneath.

Tongue wanting.

AMYDRIA. Joints of antennæ with whorls of scales, not tufted at base; third joint of palpi rather long, ascending.

Tongue nearly as long as the labial palpi.

XYLESTHIA. Joints of antennæ with whorls of scales, tufted at base; fore-wings with raised tufts.

††† Palpi hairy beneath in the ♀, reflexed and very long in the ♂.

Antennæ serrated beneath in both ♂ and ♀.

ANAPHORA. Tongue obsolete; fore-wings not pointed.

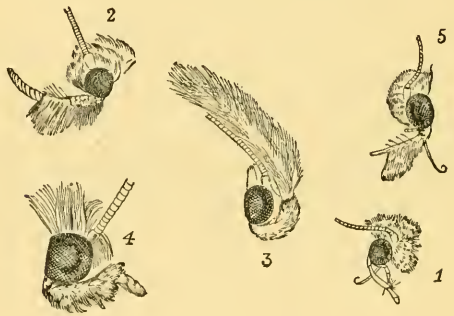
EXPLANATION OF PLATE.

Genus TINEA, fig. 1. The head of *T. crocicapitella;* 1 *a*, a portion of antenna; 1 *b*, the anterior and posterior wing of *T. lanariella.*

Genus XYLESTHIA, fig. 5. The head of *X. pruniramiella;* 5 *a*, a portion of antenna; 5 *b*, the anterior and posterior wings.

Genus AMYDRIA, fig. 2. The head of *A. effrenatella;** 2 *a*, a portion of antenna; 2 *b*, the anterior and posterior wings.

Genus ANAPHORA, fig. 3. The head of *A. plumifrontella*, the ♂ ; 3 *a*, a portion of antenna; 3 *b*, the anterior and posterior wings. Fig. 3'. The head of *A. Popeanella*, the ♀ ; 3' *a*, a portion of antennæ of the ♂.



NOTE.—Above is a copy of a photograph received from Dr. Clemens (see *ante*, p. 29) representing—

1. The head of *Tinea crocicapitella.*
2. The head of *Amydria effrenatella.*
3. The head of *Anaphora plumifrontella.*
4. The head of *A. Popeanella.*
5. The head of *Xylesthia pruniramiella.*

As already mentioned (p. 29) the Plate of which the explanation is above given was never published. H. T. S.

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* Printed *effrentella,* but Dr. Clemens has again written in pencil that an *a* should be inserted between the *n* and the *t*. H. T. S.

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CONTRIBUTIONS TO AMERICAN LEPIDOPTEROLOGY.—No. 2.

BY BRACKENRIDGE CLEMENS, M.D.

TINEINA.

LITHOCOLLETIDÆ.

IMAGO with pointed or almost caudate anterior wings, with the costal nervure rather short, and nearly coincident with the basal portion of the anterior margin; with the subcostal simple from the base to the apical third of the wing, where it delivers to the costa two or three very short marginal nervules (except in *Tischeria*); with the discoidal cell usually acute behind, with one or two branches to the tip of the wing; with the median simple nearly to the tip, and dividing into two approximated nervules, with the submedian simple. The posterior wings linear-lanceolate, with a very short costal nervure at the base; with the subcostal nervure simple; with the median nervure simple and both rather faintly indicated.

TABLE OF GENERA.

Head with a tuft above.

Tuft abundant and *hairy*.

Antennæ simple.

LITHOCOLLETIS. Anterior wings with *two* subcosto-marginal veins, and *one* from the apex of the discoidal cell.

Tuft little exceeding the front, *scaly*.

Antennæ ciliated in the ♂.

TISCHERIA. Anterior wings with *four* subcosto-marginal veins, the first from near the basal third; discoidal cell not pointed, and *two distinct* discal nervules.

Tuft scanty, not overarching the vertex.

LEUCANTHIZA.* Anterior wings with *three* subcosto-marginal veins; discoidal cell acute, with *two distinct* veins from the apex.

Head smooth.

PHYLLOCNISTIS. Anterior wings with three subcosto-marginal veins; discoidal cell pointed, with a single vein from the apex, furcate near the tip.

LITHOCOLLETIS, Zeller.

Head roughened with an abundant tuft of hairs overarching the vertex. Front smooth, broad and retreating or much retreating. Ocelli none. Eyes scarcely visible, and partially covered with scales. Antennæ simple, hardly shorter than the anterior wings, with the basal joint moderately thickened, but not expanded into an eye-cap. Maxillary palpi none. Labial palpi filiform and drooping (in the living insect ascending). Tongue naked, about as long as the anterior coxæ.

The anterior wings are pointed (from the outline of the cilia appearing to be elliptical), the posterior lanceolate. In the anterior wings the discoidal cell is *acute behind;* the subcostal nervure sends two short branches to the costa, and

* This genus, and the one succeeding[1] it, belong to the family *Lyonetidæ* in the system of European writers. The close relationship indicated in the structure of the perfect insects, and the general harmony of their histories, do not, however, in my own view, authorize the separation of the genera here described into distinct families. B. C.

[1] This is printed *preceding*, but Dr. Clemens has marked in pencil it should be *succeeding*. H. T. S.

from the apex of the discoidal cell a single vein to the tip. The median nervure sends two veins to the inner margin near the tip. In *Desmodiella* there is but *one* subcosto-marginal vein. In the posterior wings both the subcostal and median nervures are simple.

There are two larval forms in this genus. In the first, the head is much longer than broad, *acutely ellipsoidal*, with the sides rather thick and rounded; the body is cylindrical, submoniliform, and the thoracic rings somewhat swollen. In the second, the head is thin and flattened, with the mandibles forming an appendage in front; the body flattened, deeply incised and mammillated on the sides. In both groups there are *three* pairs of thoracic feet, *three* of abdominal, and a terminal pair, but shorter in the second than the first.

The larvæ mine the upper and under side of leaves, the larvæ of the first group usually throwing the leaf into a fold, and feeding from the margins of the mine to the centre; those of the second* forming a flat mine, sometimes a rather broad linear tract, and sometimes an irregular blotch, their mandibles being capable of working only in a horizontal direction. They change into pupa within the mine, some weaving a firm cocoon, some suspended in a web, and some forming a cocoon of grains of excrement and silk, or constructing the outline of a cocoon with them. The cocoons of the second group are shown on the separated epidermis as a circle, and an almost hemispherical protuberance† on the under surface.

The perfect insects rest with the antennæ thrown backward beneath the wings; some with the head slightly elevated, others with the head applied to the surface and the body behind elevated. I think the majority of the species here described assume the latter position, with variations in the angle formed with the surface on which they rest.

* I doubt much whether we have in Europe anything resembling this second group among the larvæ of the American species of *Lithocolletis*. H. T. S.

† This seems to be a very striking peculiarity. H. T. S.

Table of Species.

I. With an apical spot.

Without a basal streak.

Fore-wings golden above the fold.

2. *Robiniella,** dark cinereous beneath the fold, sometimes rather silvery.

Fore-wings pale reddish-saffron, with golden hue.

4. *Æriferella,* with the first dorsal streak black-margined internally and at tip behind.

Fore-wings deep reddish-orange.

10. *Obstrictella,* with three silvery bands; apical spot with one or two silvery scales.

With a basal streak.

Fore-wings silvery.

Basal streak black.

6. *Argentifimbriella,* † with the streaks decidedly dark-margined; golden towards the tip.

Basal streak golden.

1. *Lucidicostella,* ‡ with the streaks not decidedly margined; suffused with golden.

Fore-wings pale golden.

Silvery basal streak black-margined.

7. *Obscuricostella,* with inner margin at base of the general hue.

Silvery basal streak unmargined.

8. *Ostryæfoliella,* with inner margin at base with a white streak.

* I received four specimens of this from Dr. Clemens; it does not resemble any European species. H. T. S.

† I received one specimen of this from Dr. Clemens; it is allied to *Cramerella*, F., and *Heegeriella*, Zell. H. T. S.

‡ I received four specimens of this from Dr. Clemens; it is allied to *Heegeriella*, Zell., and *Tenella*, Zell. H. T. S.

II. With no* apical spot.

§ Apex concolorous and not dusted.

With a basal streak.

Fore-wings shining ochreous-saffron.

5. *Basistrigella,* † with first costal and dorsal streaks unmargined.

With no basal streak.

Fore-wings ferruginous-brown.

3. *Desmodiella,* ‡ ruby-tinted at base, with two silvery bands.

Fore-wings silvery.

9. *Luceticlla,* ¶ golden toward tip, with a black costal spot and opposite black line.

§§ *An oblique costo-apical white streak or spot.*

Apex not dusted with dark scales.

Fore-wings reddish-orange.

12. *Aceriella,* with a short dorsal streak near the base, two silvery bands, an oblique dorsal streak near the tip, and a costal spot above it.

Apex dusted with dark scales.

12. Var. *Aceriella* ?.

§§§ *With dispersed, dark, apical scales.*

Fore-wings reddish-orange.

With three silvery bands.

11. *Caryæfoliella,* black margin of the second band produced, apical scales on a white ground.

With two silvery bands.

13. *Guttifinitella,* black margin of second band not produced; a costal and dorsal spot near the tip.

Fore-wings white.

15. *Hamadryadella,* branded with shining ochreous-saffron; irrorated with black.

* In the original this is misprinted *an;* Dr. Clemens has altered it in pencil to *no.* H. T. S.

† I received three specimens of this from Dr. Clemens; it is near our European *Suberifoliella,* Zell. H. T. S.

‡ I received three specimens of this from Dr. Clemens; it is very splendid, and like no European species; the form of the wings is more like a *Gracilaria* than a *Lithocolletis.* H. T. S.

¶ I received five specimens of this from Dr. Clemens; it is very distinct from any European species. H. T. S.

With a basal streak.

5. *Basistrigella,** (sometimes) with *four* costal and *three* dorsal slender streaks.

16. *Argentinotella,* with *five* costal and *four* dorsal conspicuous streaks.

§§§§ *With a median, black, apical streak.*

Fore-wings dark brownish-golden.

14. *Cratægella,* with a silvery basal streak, black-margined above.

1. *L. lucidicostella.* † Antennæ white. Head and tuft silvery-white. Fore-wings, basal portion silvery-white to the middle, *with a discal pale golden streak* from the base, retreating from the costa before reaching the middle of the wing and somewhat suffused with golden beneath the fold. From the middle to the tip pale golden, with four costal silvery streaks, dark-margined internally, and two dorsal silvery streaks, the first opposite the second costal streak and both dark-margined internally; *the first costal streak not decidedly dark-margined.* ‡ Apical spot black. Hinder-marginal line in the cilia dark brown; cilia pale gray. Hind-wings shining bluish-gray; cilia gray.

The larva mines the under side of the maple leaf, *Acer saccharinum,* in July, September and October. The head is pale brown; body pale green, coloured darker by the ingesta. "Frass" collected into a ball within the mine. The pupa is suspended in a web of silk within the mine.

2. *L. Robiniella.* § Antennæ dark brown. Front silvery

* I received three specimens of this from Dr. Clemens; it is near our European *Suberifoliella*, Zell. H. T. S.

† I received four specimens of this from Dr. Clemens; it is allied to *Heegeriella*, Zell., and *Tenella*, Zell. The exp. al. (omitted by Dr. Clemens) is 3½ lin. H. T. S.

‡ There is some mistake in this sentence, the first *costal* streak is decidedly dark-margined; the first dorsal streak, it is true, has scarcely a perceptible margin—it should probably be *the first costal streak decidedly dark-margined*, or else *the first dorsal streak not decidedly dark-margined.* H. T. S.

§ I received four specimens of this from Dr. Clemens; it does not resemble any European species. The exp. al. (omitted by Dr. Clemens) is 3 lin. H. T. S.

white, tuft dark brown, mixed with grayish. Thorax dark brown. Fore-wings golden-yellow above the fold, and dark cinereous, somewhat dusted with blackish, beneath it. About the middle of the wing is an oblique, silvery costal streak, black-margined on both sides, extending to the fold; another beyond the middle, meeting nearly in the centre of the wing at an angle, a dorsal streak from the inner margin, the former black-margined on both sides, the latter internally; another costal streak near the tip with an internal circular black margin opposite to a dorsal streak of the same hue and joined or nearly joined to it. Just behind the apical spot is a straight silvery streak, black-margined internally. Between the first and second dorsal streaks is a short black streak in the fold. Apical spot black and round, with a hinder-marginal blackish line in the cilia; cilia grayish. Hind-wings shining dark gray, cilia the same.

The larva mines the underside of the locust leaf (*Robinia pseud-acacia*), the separated epidermis of which is conspicuously white. It may be found in the latter part of September and the beginning of October. The pupa is contained in a white silken cocoon within the mine. The imago appears in the latter part of October or early in November. I have not found a spring or summer brood in the leaf of the locust. The larva is cylindrical; the head pale brown; the body pale greenish-white, with a red vascular line from the 5th to the 9th segment; on the 9th segment are two irregular patches, chrome yellow; sometimes these patches are wanting.

The under side of the leaf of *Amphicarpæa monoica* is also mined by a larva, which I believe is the same as that in the leaf of the locust. It may be found in the beginning of September, the imago in October. The imago differs very slightly from *Robiniella*, and I have no note of any difference in the larval state, and, like *Robiniella*, it weaves a white silken cocoon within its mine. The perfect insect differs from the foregoing species in the following respects: the wing *beneath* the fold is blackish at the base, with a silvery

dorsal spot rather nearer the base than the first costal spot and exterior to the dark margin, it is silvery, dusted with blackish; the *second* costal spot is not as distinctly angled in the middle, and the apical spot is larger; in some specimens there are two dorsal white lines on the thorax. The general resemblance between the two is so marked that I consider it unnecessary to designate it as a variety, for it is undoubtedly, I think, the same insect.

With a single subcosto-marginal nervule.

3. *L. Desmodiella.** Antennæ dark brown, tipped with a silvery hue. Front whitish, with a ruby-coloured lustre; frontal tuft dark brown. Thorax with a splendent ruby hue. Fore-wings ferruginous-brown, ruby-tinted at the base, with two silvery bands dark-margined on both sides, one near the base and one in the middle of the wing. A costal and dorsal silvery spot near the tip, opposite to each other, and a costal silvery spot just before the tip, the two former dark-margined on both sides, and the latter slightly dark-margined. No hinder marginal line; the cilia opposite the last dorsal spot blackish, and the wing beneath the last costal spot golden-brown. Hind-wings pale brownish-gray, cilia the same.

The larva may be found in the leaf of *Desmodium viridiflorum* in July and early in August; it mines the under surface, usually near the margin, which is more or less folded, and the separated epidermis brown and hairy. I have no description of the larva. It becomes a pupa during the latter part of August, and is suspended within the mine in a very slight web of silk. The perfect insect is the smallest of this group that has come under my observation.

4. *L. Æriferella.* Antennæ dark brown above, white beneath. Front silvery-white; tuft dark brown. Fore-wings

* I received three specimens of this insect from Dr. Clemens; it is very splendid and like no European species; the form of the wings is more like a *Gracilaria* than a *Lithocolletis*. The exp. al. (omitted by Dr. Clemens) is 2 lin. H. T. S.

pale reddish-saffron with a golden hue, especially from the middle to the base, with four silvery costal streaks, the first on the middle of the costa, and all, except the last, black-margined toward the base, the third but faintly, and the costa black from the base to the first costal streak. Three silvery dorsal streaks on the inner margin, the first two large and the third small, the first black-margined internally and around the tip behind, the second by a line curved above. Apical spot small and black, with the scales behind it having a bluish splendent lustre; hinder marginal line blackish; cilia dark grayish, with a fulvous hue. Hind-wings dark gray; cilia fulvous.

The larva may be found in the leaves of oaks in September and early in October. It makes a small mine on the under surface, and the leaf is thrown into a fold previously to pupation and the cuticles folded and corrugated. The pupa is contained in an ovoid cocoon within the mine, composed of "frass" and silk. The imago appears in May. The body of the larva is cylindrical. The head is pale brown; the body yellow, with a broad, vascular, reddish-brown band. There is doubtless a spring brood, but I have not searched for the larva during the season.

5. *L. basistrigella.** Antennæ silvery. Front silvery, tuft fulvous, mixed with silvery. Thorax pale, reddish-golden, with a white streak on each side and one in the middle. Fore-wings shining ochreous-saffron, with a slender unmargined white basal streak in the fold, a white basal streak along the costa, narrowly dark-margined on the extreme costa, extended to the first costal streak, which is silvery-white, very oblique and unmargined; behind this are three small costal streaks of the same hue, the two central dark-margined internally. Opposite the first costal streak is a long, very oblique, silvery-white dorsal streak, extended

* I received three specimens of this from Dr. Clemens; it is near our European *Suberifoliella*, Zell., but smaller, the basal streak shorter, the subapical streak more distinct and the ground colour darker. The exp. al. (omitted by Dr. Clemens) is 4 lin. H. T. S.

along the inner margin to the base, with dark brown scales between their hinder ends, or exterior to the tip of the dorsal streak, but sometimes absent. Nearly opposite the third costal streak is a dorsal silvery streak dark-margined internally. No apical spot, sometimes with dispersed brown scales beneath the last costal spot. The hinder-marginal line blackish; cilia pale fulvous. Posterior wings gray; cilia gray, with a fulvous hue.

The larva mines the under side of the leaves of oaks; I have usually found it in the leaf of the chestnut oak, in September. The mine is limited by two veins of the leaf, and when completed the external epidermis is left transparent. The "frass" is cast on the margins of the mine, and when the larva is prepared to enter the pupa state it collects the grains of "frass" and makes an oval outline of them within the mine, or wall to its cocoon, leaving the cuticles transparent, so that the pupa can be seen within. The imago appears early in May. The body of the larva is cylindrical. It is lemon-yellow along the dorsum, except the three anterior rings, which are whitish, with a series of dark brownish dorsal dashes beginning on the third ring; on the eighth ring, in some specimens, is a dorsal reddish-orange patch. Head whitish, tinged with pale brown.

6. *L. argentifimbriella.** Antennæ silvery, annulated with darkish brown. Head, front and thorax silvery-white. Anterior wings silvery, pale golden from nearly the middle to the tip, with a long basal dark-brown streak margined above with golden, extending nearly to the first costal streak. There are four silvery costal streaks, all dark-margined, the first very oblique, the second convex toward the base of the wing. The first costal dark margin is decided and extended on the costa toward the base. Two silvery dark-margined dorsal streaks, the first opposite the second costal streak.

* I received one specimen of this from Dr. Clemens; it is allied to *Cramerella*, F., and *Heegeriella*, Zell. The exp. al. (omitted by Dr. Clemens) is 3½ lin. H. T. S.

The apical spot black; hinder-marginal line dark brown, cilia silver-gray. Hind-wings silver-gray, cilia the same.

Found in the pupa state in the same leaf as the foregoing in the latter part of September. The pupa is suspended within the mine in a very thin silken web. The perfect insect appears early in May.

7. *L. obscuricostella.* Head and frontal tuft silvery. Thorax very pale golden. Fore-wings pale golden, with a silvery median stripe from the base, *black-margined toward the costa,* extending to the middle of the wing; with four silvery costal streaks, the first very oblique and rather long, and all except the last black-margined internally, the margin of the first being long and the continuation of a black streak from the base along the extreme costa. Three silvery dorsal streaks, the first quite long, obliquely curved and opposite the first costal streak, and the first two black-margined internally; *the second dorsal obliquely opposite the third costal streak.* Apical spot black: hinder-marginal line black, cilia grayish. Hind-wings bluish-gray, cilia the same. *Abdomen black, tipped freely with yellow.*

The larva mines the leaf of *Ostrya Virginica* (hop-hornbeam) in September. I have no description of the larva, supposing at the time of capture it was the same as the succeeding species. The pupa was not contained in an ovoid cocoon made of "frass" and silk. The imago appears in May.

8. *L. Ostryæfoliella.* Antennæ silvery. Front silvery, tuft fuscous and silvery mixed. Thorax silvery, with the basal part of tegulæ pale golden. Fore-wings pale golden, with *an unmargined, median, silvery basal stripe, and a silvery streak along the basal portion of the inner margin.* Fore-wings pale golden, with four silvery costal streaks, all except the last black-margined internally; with two dorsal streaks of the same hue, black-margined internally. The first costal and first dorsal streaks opposite, quite oblique and

broad at their bases, *the second dorsal opposite the second costal streak.* The basal streak is moderately broad, and extends quite to the middle of the wing. Apical spot black; hinder-marginal line blackish; cilia fulvous-gray. Hind-wings gray, cilia fulvous-gray. *Abdomen pale fulvous.*

The larva mines the under side of the leaves of *Ostrya*, and may be found early in July and October. The mine is usually near the margin of the leaf, is flat at first, but is gradually thrown into a fold, the separated epidermis corrugated. When completed the epidermis has changed to a pale brown colour. The larva undergoes its transformation in a cocoon composed of "frass" and silk, in the form of a small ovoid ball suspended within the mine. The larva is cylindrical, with the body pale yellow, coloured on the dorsum beyond the third segment dark green from the ingesta. The imago appears in August and May.

In the same leaf, mining the upper surface in a blotch mine, at first white and subsequently brown, may be found in October a *Lithocolletis* larva* of a different type from the above. It tapers posteriorly, is flattened above and beneath, with the rings distinctly separated and mammillated at the sides; the first ring is rather abrupt anteriorly and much broader than the head. The head is somewhat triangular, flattened and thin, with the mandibles projecting in front as two small, rounded appendages. The head is pale brown, the body of the same hue, with dorsal, dark brown, elliptical maculæ, placed transversely on the segments. I have not seen the imago and refrain from naming the species, lest it may be identical with some one hereafter described. The cocoon is *circular*, its outline being visible on the upper

* I was at first disposed, from the description, to refer this larva to the genus *Tischeria*, but on closely examining some cocoons sent me by Dr. Clemens (from which unfortunately I did not rear any moths), I cannot *decidedly* say they belong to the genus *Tischeria;* moreover, a very singular fact is, that these cocoons occur two or three on one leaf, and almost in immediate contact with one another. H. T. S.

epidermis as a circle, while beneath it is raised and prominent.

9. *L. lucetiella.** Antennæ silvery. Head, tuft and thorax silvery. Anterior wings silvery from the base to the middle, and thence to the tip golden, with a golden costal streak from the base not extended to the middle. About the middle of the wing is a silvery band, broadly margined internally with golden, and with a *minute black point* on the costa internally; a costal silvery spot, margined internally by a *black spot*, nearly opposite to which is a large dorsal silvery streak margined internally by an *oblique black line;* near the tip is a costal, silvery, unmargined streak curving to the tip; cilia golden at the tip, and on inner margin silvery. No apical spot nor hinder-marginal line. Hind-wings silver-gray, cilia the same. Abdomen blackish, tipped with silvery-gray.

The larva mines the under side of the leaf of *Tilia Americana* (bass wood) in July, September and October. The mine is most frequently nearly square in form, and when completed both cuticles of the leaf are left nearly transparent, and the leaf is not folded. The "frass" is cast on the edges of the mine. It weaves an oval cocoon, thin enough, however, to permit the pupa to be seen through the cuticles. The larva is cylindrical. The head pale brown; the body pale greenish-white, with a series of dorsal brown spots from the third ring posteriorly. The imago appears in August and May.

10. *L. obstrictella.* Antennæ silvery beneath, blackish above, with a whitish band near the tip. Front silvery, with a reddish tinge on the forehead. Tuft and thorax reddish-orange. Fore-wings deep reddish-orange, with three

* I received five specimens of this from Dr. Clemens; it is very distinct from any European species. The exp. al. (omitted by Dr. Clemens) is 3½ lin. H. T. S.

silvery bands black-margined exteriorly, one beyond * the middle toward the base, one about the middle and one near the tip. A large black apical spot, with a few silvery scales or minute spots; hinder-marginal line dark brown, cilia reddish-orange. Hind-wings blackish, cilia blackish-brown. Abdomen black.

The larva mines the under surface of oak leaves, in September. I did not open the mines of the specimens I secured, as I had but two. The larva was cylindrical, and through the unruptured cuticle appeared to be of a lemon-yellow colour. The pupa was contained in a very slight web within the mine. The imago appeared in May. The larvæ which I secured were taken in the leaves of the *black oak* on September 23rd.

11. *L. Caryæfoliella.* Antennæ silvery, annulated with blackish. Front silvery. Tuft and thorax reddish-orange. Fore-wings reddish-orange, with three silvery bands, black-margined exteriorly, the second about the middle of the wing, angulated, with the black margin broad and produced posteriorly on a whitish ground, nearly to the third, which is somewhat interrupted in the middle; the first midway between the second and the base of the wing and also angulated near the costa. The apical portion of the wing white, covered with dispersed black scales, with a few black scales on a whitish ground, on the costa, between the last silvery band and the dusted apical portion; with two hinder-marginal lines, one the margin of the apical scales, the other a dark brownish line in the cilia. Hind-wings pale brownish-gray; cilia gray, with a fulvous hue.

The larva mines the upper side of the leaves of the hickory tree in June, July and September, making a white blotch, or an irregular, rather broad tract when there is but one in the leaf; and not throwing the leaf into a fold. Frequently there are several larvæ in a leaf; in one instance I

* This is surely a misprint for *before*. H. T. S.

counted twelve. The "frass" is deposited along the middle of the mine. The larva is flattened and its physical characteristics are similar to those of the second larval group. The head is very light brown; the body dark lead colour, becoming yellowish posteriorly, with the mammillæ of the thoracic rings yellowish, and a central spot of the same hue on the first; each ring on the dorsum with a dark brown, shining macula, those on thoracic rings trapezoidal, the remainder oval; on the ventral surface the maculæ are also dark brown, those on the fourth and fifth rings being oval. The perfect insects of the spring brood appear in August; from the fall brood I did not succeed in rearing the imago.

12. *L. aceriella.* Front silvery, tuft reddish-orange and silvery mixed. Thorax reddish-orange. Fore-wings reddish-orange, somewhat metallic, with a white streak black-margined exteriorly, *from the inner basal angle to the fold;* with two oblique silvery bands black-margined behind, one about the middle of the wing and the other midway between it and the base of the wing. Near the tip is a costal silvery spot, black-margined behind, with an opposite, oblique, dorsal streak of the same hue, likewise black-margined behind, and an oblique, costal, silvery streak continued on the line of the last dorsal, running into the cilia just before the tip, black-margined *above*, at the tip before, and *below* at the tip behind; scarcely with a hinder-marginal line, cilia of the general hue. Hind-wings plumbeous, cilia with a fulvous hue.

The larva mines the leaf of maple in September. It mines the upper surface of the leaf, making a flat, rather broad tract, casting its "frass" along the middle of the course of it. Physical characteristics those of the second larval group. Head pale brown; body yellowish-green, with oval, dorsal, brown maculæ, darkest on their margins; thoracic rings on their sides pale yellowish. The cocoon is circular. The larva is likewise found in the leaf of *Hamamelis Virginica* (witch-hazel).

I have two or three other specimens, which appear to unite the specific characters of the present and succeeding species, and I therefore decline to describe them until I have conducted more careful observations on their embryonic histories than I have instituted at present.

13. *L. guttifinitella.* Front silvery, with a reddish hue. Tuft and thorax reddish-orange. Antennæ blackish-brown. Fore-wings rather deep reddish-orange, with two silvery bands black-margined behind, one in the middle of the wing and nearly straight, the other midway between this and the base of the wing and obliquely placed. Before the costo-apical cilia is a costal silvery spot, black-margined on both sides, with an opposite dorsal spot, black-margined behind. The apical portion of the wing is dusted with blackish, dispersed scales, with a white spot near the tip above the middle of the wing. There are two hinder-marginal lines, one the margin of the dispersed scales, the other dark brownish in the cilia.

The larva may be taken in August and September in the leaf of *Rhus toxicodendron* (Poison Oak), mining the upper surface in a rather broad, tortuous tract, and there are ordinarily several in the same leaf. The larva belongs to the second larval group. The head is a fine pale brown; the body yellowish posteriorly, becoming brownish above, with dorsal and ventral dark maculæ. The cocoon is circular, formed within the mine as usual in this group in a little circular depression.

It is probably unnecessary to caution the collector to be careful in handling the leaves of the food-plant of this larva; to many persons they are poisonous, producing a very disagreeable and uncomfortable eruption. I was affected by it when I first collected this species, and would advise all others to handle the food-plant "with gloves."

14. *L. cratægella.* Antennæ, front and tuft dark silvery-gray. Fore-wings rather deep brownish-golden, with a broad silvery basal streak, black-margined toward the costa, ex-

tended to the tegulæ in front and pointed behind, with the point black-margined on both sides and with the costa black. Four costal silvery streaks, the first oblique but rounded beneath and black-margined on both sides, the others toward the base alone. Three silvery dorsal streaks, the first rather broad, oblique, nearly touching the first costal, and black-margined on both sides, as also the second; the third only toward the base. A streak of black scales in the middle of the wing at the apex, extended backwards between the streaks to the second dorsal and costal. Hinder-marginal line blackish, with a violet metallic hue; cilia dark fulvous.

The larva mines the underside of black thorn* during September and October. The mine is usually limited by two veins of the leaf. The larva is cylindrical, with a very pale brown head; the body yellowish, coloured dark green by the ingesta. The imago appears in April and May.

15. *L. hamadryadella.* Front, tuft and thorax white. Antennæ white, annulated above with blackish. Fore-wings white, with an angulated, shining, ochreous band, rather behind the basal third of the wing, black-margined internally with dispersed scales; a broad angulated band of the same hue, behind the middle, black-margined internally with dispersed black scales, produced in the middle, so as to divide it into two portions, with the space between the bands somewhat suffused behind the second with ochreous-saffron, and an irregular line of blackish, dispersed scales through the middle of it. Near the tip is a costal and dorsal ochreous-saffron spot, with the white space between these and the second band dusted with blackish, with the apical portion white, dusted with black scales, and connected with the patch before it by a line separating the costal and dorsal spots. The basal portion of the wing somewhat dusted with black, with a small blackish patch on costa near the base, and two

* In Asa Gray's Manual of the Botany of the Northern United States, the name of "Black or Pear Thorn" is assigned to *Cratægus tomentosa.* H. T. S.

small, faint saffron patches beyond it. The hinder-marginal line blackish, cilia with a fulvous hue. Hind-wings rather dark silvery-gray, cilia with a fulvous hue.

Variation F.

The first ochreous-saffron band interrupted in the middle, with a broad internal margin of scattered scales, produced behind in the middle; the second somewhat diffuse, with the irrorated portion of the wing spreading out behind from the produced part of its black margin.

Variation G.

With an angulated line of blackish scales before the first band and an ochreous-saffron patch between its angle and that of the black margin of the first band.

The larva mines the upper side of the leaves of oaks in July. The head is black, the body pale yellowish, with an ochre-yellowish patch on the dorsum of the eighth segment, a dark vascular line and a few dark subdorsal spots posteriorly. The imago appears early in August. The variations F. and G. were specimens found in the pupa state.

3/15/1028. 16. *L. argentinotella.* Antennæ silvery. Front and tuft silvery. Thorax pale reddish-saffron, with a rather short, unmargined, silvery basal streak, with *five* costal streaks and *four* dorsal streaks of the same hue. The first costal and dorsal streaks unmargined, the first dorsal being near the inner angle of the base, tapering to a point in the middle of the wing from a very broad base; the first costal streak rather slender and only one-half as long as the first dorsal; the second costal and second dorsal connected about the middle of the wing, and dark-margined toward the base by a line much curved in the middle; the third costal and third dorsal opposite, and each dark-margined internally; the fourth dorsal about midway between the fourth and fifth costal streaks; sometimes the fourth costal and dorsal streaks with a few dark internal scales, sometime unmargined. At the

apex is a small patch of scattered black scales; the hinder-marginal line rather indistinct; cilia saffron, paler on inner margin. Hind-wings shining silver-gray, cilia rather darker.

I am unable to give any account of this species. The specimens were unmarked by any number referring to my notes, and I suppose I must have mistaken it for some other, as I did not observe its peculiar markings until I came to write the present paper. I hope, however, to supply its larval history next season, now that the species thus far met with are tabulated in a manner which will facilitate recognition.

The following genus belongs, in the arrangement of European systematists, to the family *Elachistidæ*. I do not think any argument necessary to prove that it is a natural portion of *Lithocolletidæ*, which is usually regarded as being composed of a single genus.

Tischeria, Zeller.

Head with a rather erect frontal tuft of scales; the front smooth, narrow and but little inclined. Ocelli none. Eyes rather salient, *naked* and not covered with scales in front. Antennæ scarcely more than one-half so long as the anterior wings, with *rather long pilose ciliations* beneath in the ♂, simple in the ♀, with the basal joint tufted in front. Maxillary palpi *very short and scarcely perceptible*. Labial palpi short, filiform and drooping. Tongue scaled, as long as the anterior coxæ.

The wings with long cilia; the anterior pointed, almost caudate, the posterior lanceolate. The discoidal cell of the anterior not pointed, closed in front by *a very faint nervure*, and with *a faintly indicated secondary cell*, beyond which the subcostal nervure is almost obsolete. The subcostal nervure sends *four veins* to the costa, the first of which is rather long and arises near the basal third of the wing; the discal emits a simple vein to the costa above the tip and one to the inner margin beneath. The median nervure sends two veins to the inner margin near the tip. The submedian is simple.

The head of the larva is circular in outline, thin, flat and nearly as broad as the first ring. The body tapers much posteriorly, is subcylindrical and moniliform, with the anterior rings slightly dilated, with the segments rounded and distinct at the sides; with three* thoracic feet, four* abdominal and one terminal pair, all of which are extremely short, and are scarcely more than cup-like depressions.

The mine is usually made, if not always, near the margin of the leaf, which, in this case, is folded and curled so as almost to conceal the separated epidermis when completed, although in the beginning it is nearly flat. It contains no "frass," and an examination of the under surface reveals the presence of minute, round holes, through which the larva ejects its excrement. The pupa is contained within the mine, generally not in a cocoon, but the mine is carpeted throughout with silk, thus closing up the holes in the lower surface. The pupa case is thrust from the mine at maturity.

The imago reposes with its head elevated, and the tips of the wings touching the surface on which it rests. The antennæ are thrown back beneath the wings, the anterior legs folded on the breast, the insect sustaining itself by means of the middle and posterior legs.

Table of Species.

Fore-wings with isolated black atoms.

Solidagonifoliella, yellowish, slightly tinted with fuscous.

Fore-wings immaculate.

Hind-wings concolorous.

Zelleriella, yellowish, with reddish-saffron at the tip.

Female? the entire insect reddish-ferruginous.

Hind-wings with a fuscous patch near the base.

Citrinipennella,† bright yellow, reddish-ferruginous at tip.

* "Pairs of" is of course understood in each case. H. T. S.

† I received one specimen of this from Dr. Clemens; it is intermediate between our *Complanella,* Hüb., and *Marginea,* Haw. H. T. S.

T. solidagonifoliella. Head, thorax and antennæ pale yellowish. Fore-wings yellowish, somewhat tinted with fuscous, with a short line of black atoms along the middle of the inner margin, two small patches or much scattered, isolated black atoms toward the base of the wing, a patch near the tip on the inner margin, with a minute patch or a few isolated atoms on the costa between the line and patch on inner margin; at the tip are a few isolated atoms. Hind-wings very pale yellowish, cilia the same.—The male described.

Found in the pupa state August 1st in the leaf of a species of *Solidago*. The mine was on the upper surface and the leaf not folded. The pupa was contained in a *slight circular cocoon*, attached to the upper cuticle, which formed its upper walls. On August 9th the imago appeared, the pupa case having been thrust through the *under side* of the leaf.

T. Zelleriella. Antennæ, head and thorax pale yellow. Fore-wings yellowish, with reddish-saffron along the middle and toward the tip; cilia reddish-saffron, pale yellow on the inner margin. Hind-wings bluish-gray, *tinted with yellow externally toward the tip*, cilia yellow on the exterior margin toward the tip, internally pale yellowish-gray.

Female? The head, thorax and fore-wings yellowish, suffused with reddish-ferruginous, darkest toward the tip. Hind-wings dark gray.

The larva mines the leaves of oaks in September, making at first a white blotch on the upper surface, but subsequently the upper epidermis becomes brown and the margin of the leaf curled. The head is dark brown; the body yellowish, with the dorsum of the first segment blackish, with two lateral minute pale spots; a vascular dark green line. The imago appears early in May, and there is, therefore, a spring brood.

*T. citrinipennella.** Antennæ pale fuscous; head and thorax yellowish, tinted with reddish-saffron. Fore-wings bright yellow from the base nearly to the tip; apical portion reddish-ferruginous. Hind-wings dark grey, with a fuscous patch near the base; cilia pale fuscous. The male described.

There is but little difference between this and the foregoing species, either in the perfect or larval state. The larva mines the upper surface of oak leaves, in September. The head is dark brown; the body yellowish-green, with a double dark-brown macula on the dorsum of the first ring; vascular line very narrow and dark green. A more careful examination than I have given these insects may prove them to be the same, or the latter a variation. I have but a few of each of them. The imago appears early in May, and a spring brood will be found in early summer.

Phyllocnistis, Zeller.

Head smooth, elongated above, and clothed with imbricated scales. Front with scales closely appressed, slightly retreating and broad at the clipeus. Forehead or vertex globosely rounded. Ocelli none. Eyes scarcely visible in front, and partially covered with scales. Antennæ simple, *one-third* less long than the anterior wings; basal joint scarcely with an eye-cap, somewhat enlarged and flattened, but smooth and squamose. Maxillary palpi none. Labial palpi very slender, and drooping (in the living insect they are ascending). Tongue very slender, *naked* and scarcely as long as the anterior coxæ.

The anterior wings almost caudate, the posterior lanceolate. In the anterior wings the discoidal cell is *acute behind;* the

* I received one specimen of this from Dr. Clemens; it is intermediate between our *Complanella*, Hüb., and *Marginea*, Haw. The description would be improved by adding, "there is a faint gray spot at the anal angle of the anterior wings." The exp. al. (omitted by Dr. Clemens) is 4 lin. H. T. S.

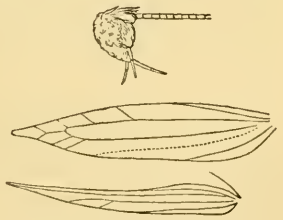
subcostal nervure sends three short branches to the costa, and from the apex of the discoidal cell arises a branch *furcate* behind the tip, one of the nervulets proceeding to the costa before the tip, the other to the inner margin. The median nervure sends two approximated veins to the inner margin near the tip. In the posterior wings the subdorsal is simple, ending in the tip, the median furcate near its marginal extremity.

The head of the larva is thin, flat and circular, with the mandibles forming an appendage in front on the median line similar to some of the *Lithocolletis* larvæ.

The body tapers somewhat posteriorly, with the sides of the segments slightly projecting and flattened, with the general form rather cylindrical. It is without feet or prolegs, and is very inactive, making little or no voluntary motion when removed from the mine, and does not retreat in its mine when touched. The body is somewhat viscid.

The mine is a linear tract just wide enough to accommodate the body, long and winding. The larva does not consume all the parenchyma of the leaf along its tract, but simply separates the upper epidermis, so that it is not transparent. When full grown the end of the mine is enlarged, and the cocoon woven in a little pucker of the leaf within the mine.

The perfect insect is very sluggish, at rest carrying its antennæ thrown backward, but arched somewhat above the dorsal surface.



Sp. 32 *P. vitigenella.** Antennæ brownish-silvery, fuscous at the tip. Head and thorax silvery-white. Fore-wings silvery-

* Printed *Vitegenella*, but corrected in pencil by Dr. Clemens to *Vitigenella*. I received two specimens of this from Dr. Clemens; it is closely allied to our *Suffusella*, Zell., and *Saligna*, Zell., but is smaller, and the position of the subapical dorsal streak is different. The exp. al. (omitted by Dr. Clemens) is 2½ lin. H. T. S.

white, slightly golden toward the tip, with a blackish dorsal patch on the inner margin near the base. Somewhat behind the middle of the wing is a black oblique costal streak, and a black line curving from the costa to the inner margin. At the tip is a circular black spot, and before it on the costa two short, straight, black streaks. At the extreme tip of the wing are two blackish, diverging streaks in the cilia, with one of the same hue in the cilia beneath the apical spot, nearly joining a black hinder-marginal line; cilia silvery. Hind-wings silvery, cilia the same.

The larva mines the upper side of the leaf of *Vitis cordifolia*, and perhaps other species, in September and October. The imago appears in September.

Leucanthiza.

Head slightly hairy above on the vertex. The front smooth, covered with closely appressed scales, broad, even beneath and somewhat inclined. The forehead or vertex rather acutely rounded above or ridge-like. Ocelli none. The eyes scarcely visible in front, partially concealed by scales. Antennæ simple, nearly or quite as long as the anterior wings, the basal joint squamose and but little larger than the stalk. Maxillary palpi none. Labial palpi very slender and drooping. Tongue naked, as long as the anterior coxæ.

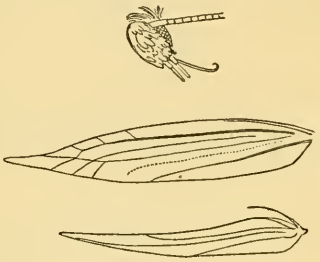
The fore-wings are almost caudate at the tip; the posterior lanceolate. The discoidal cell of the fore-wings is *acute behind*, with *two veins* emitted at its point, one to the costa before the tip, the other to the inner margin. The subcostal nervure sends three short veins to the costa, and the median two approximated veins to the inner margin. In the hind-wings the subcostal and median are both simple, and the *latter* extended to the tip.

The head of the larva is very thin and flat, with projecting mandibles in front. The body is much flattened, tapering anteriorly and posteriorly, the rings separated by rather deep

incisions, and their ends on the sides mammillated, the rings themselves being rather elongated ellipsoids.

The thoracic feet are *three*,* and mere mammillæ; the abdominal three,† but their appearance not very distinct, and a terminal pair. The larva approaches that of the second group of *Lithocolletis* very closely.

The mine is a conspicuous white blotch on the upper surface, generally occupying the greater portion of the leaf, and sometimes, when two are present in the same leaf, the whole of it. A day or two previously to undergoing its last moulting, the larva ceases to eat, and at the end of that time, leaving its "cast" within the mine, abandons it to construct a white silken cocoon, which is woven on some substance on the surface of the ground.



The perfect insect holds the antennæ extended at the sides when at rest, and moves them with a rotatory motion during progression.

33 *L. amphicarpeæfoliella.* Head golden, with fuliginous hairs above. Antennæ golden-brown, with the tips silvery-white. Thorax golden, fuliginous in front, and abdomen golden-brown. Fore-wings deep orange-yellow, with the apical portion dark golden-brown, and a fuliginous or deep brown patch occupying the basal part of the wing, bordered broadly behind by a circular golden streak, extending from the costa to the inner border at the basal angle. A very oblique, somewhat curved, golden streak, dark-margined on both sides, extends from the basal third of the wing, near the costa, to the middle of the costa. A large golden patch, dark-margined above, extends from the inner angle to the middle of the wing, with the inner margin between it and

* *Pairs*, of course; why the *three* is italicised I cannot conceive. H. T. S.

† *Pairs*, of course. H. T. S.

the circular basal streak dark golden-brown. At the beginning of the costal cilia is a golden dorsal* streak; cilia dark brown, in certain lights golden-brown. Hind-wings dark grey, cilia the same.

The larva makes a conspicuous white blotch mine on the upper surface of the leaf of *Amphicarpæa monoica* (hog peanut) from August to October. The head is pale brown; the body pale green, with brownish maculæ along the dorsum, and round dark-brown spots on the ventral surface; the ends of the first ring on the sides are yellowish. After the last moulting the body is uniformly dark green, the "cast" with dorsal maculæ being left within the mine. The imago appears about the middle of May. This insect is one of the most beautiful I have met with.

Note.—The reader is requested to make the following corrections in the paper contained in the September number of the Proceedings.

Page 257, line 9 from the top, after "*two*" insert *or three*.†

Page 260, instead of *A. effrentella* read *A. effrenatella*, and also in the explanation of the plate, p. 262.‡

* So printed. H. T. S.

† See *ante*, p. 48, note *. H. T. S.

‡ See *ante*, pp. 55 and 60, notes *. H. T. S.

[Reprinted from the Proceedings of the Academy of Natural Sciences of Philadelphia, January, 1860, pp. 4—15.]

CONTRIBUTIONS TO AMERICAN LEPIDOPTEROLOGY.—No. 3.

BY BRACKENRIDGE CLEMENS, M.D.

TINEINA.

THE plan of these papers will hereafter be changed, and no diagnosis of genera will be given, except when there is doubt respecting the identity of the European and American groups, and when the genera are new. The intention of giving some conception of the systematic arrangement of the group TINEINA will therefore be abandoned, and the subsequent papers be confined simply to the description of species. I find myself compelled to adopt this course, in consequence of perceiving, as I advance in the recognition of generic groups, that the diagnoses of the families heretofore cited are too limited, and that, in order to represent my conception of these groups, I shall be obliged to make them more comprehensive. These changes, together with the generic synopses of the families, will be best treated in a monograph of the TINEINA, which will be undertaken as soon as the collection of the writer represents, with some degree of completeness, the genera found in our country. In order that the accomplishment of this may not be too long delayed, contributions of specimens are respectfully solicited from collectors, either in accordance with the call from the Secretary of the Smithsonian Institution, in the Report of 1858, or the request made at the present time. Contributions may be sent to the Smithsonian Institution, or to myself, but in the latter case,

the charges for carriage must be prepaid; and should the contributor desire it, a suite of named specimens will be returned to him. Full directions for the collection and preservation of *Lepidoptera* are contained in the Smithsonian Report for 1858,* and may be had on application to the Secretary of the Institution.

Coleophora, Zeller.

Stalk of antennæ clothed with erect scales to the middle.

C. coruscipennella.† Labial palpi and head bronzy-green. Antennæ, basal half bronzy-green, with a reddish-violet reflection; terminal half white, annulated with brown. Fore-wings uniform bronzy-green, with the apical portion reddish-violet, or of a reddish-coppery hue. Hind-wings dark brown; cilia the same.

Stalk somewhat thickened, with scales not erected.

C. laticornella. Labial palpi and head brownish-ochreous. Antennæ pale brownish-ochreous towards the base, becoming white, with an ochreous tinge, toward the tip, and annulated with dark brown throughout. Fore-wings rather deep, uniform brown, with a whitish-ochreous streak along the costa, from the base to the costo-apical cilia, narrowing behind, and not reaching beyond the subcostal nervure. Hind-wings rather dark brown; cilia the same.

Antennal stalk simple; basal joint thickened with scales.

C. cœnosipennella. Labial palpi and head white. Antennæ white, annulated with dark brown; basal joint white. Fore-wings dull yellow, with a white streak along the basal portion of inner margin, one along the costa and one along the sub-costal nervure, separated from the former by a narrow

* See *ante*, p. 18. H. T. S.

† I received five specimens of this from Dr. Clemens; it is very nearly allied to our *Fabriciella*, Villers, but is a little browner. The exp. al. (omitted by Dr. Clemens) is 5½ lines. H. T. S.

line of the general hue; an oblique, white streak along the disk, and inclined to the inner angle, and one in the fold, with three rather faint, oblique, white streaks between the terminal portions of the costal and discal streaks. Hind-wings rather dark gray; cilia fulvous.

37 *C. infuscatella.* Labial palpi brownish-gray. Head pale leaden-gray, whitish on the sides and above the eyes. Antennæ gray, annulated with dark brown. Fore-wings grayish-brown, with a white streak along the costa to the tip, and one along the inner margin; a white streak along the fold, and one parallel to it along the middle of the wing and somewhat dilated on the inner margin; cilia grayish-brown. Hind-wings gray; cilia the same.

38 *C. cretaticostella.* Labial palpi white. Head white, tinged with yellowish. Antennæ white, annulated with brownish. Fore-wings shining yellow, with a rather broad white streak along the costa, extended nearly to the tip; somewhat streaked with ochreous, and the *tip rather deep ochreous.* The inner margin of the wing is whitish. Hind-wings ochreous-brown; cilia the same.

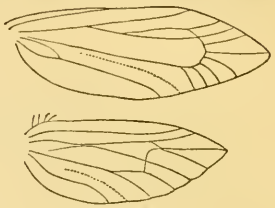
INCURVARIA, Haworth.

39 *I. russatella.* Head ochreous. Antennæ dark brown, ochreous at the base, and annulated with ochreous. Thorax purplish-brown. Fore-wings deep fuscous, with a beautiful purple reflection. Near the base of the wing is a very pale yellow band, broadest on the inner margin, and a costal and dorsal spot of the same hue opposite each other, a little beyond the middle of the wing. Hind-wings pale fuscous, tinged with purplish-red; cilia pale brown.

The wing structure of the following species departs from that of the genus. Both wings are pointed, the fore-wings with a *single* discal nervure, given off to the inner margin,

and the hind-wings with two discal nervules branching from a common stalk.

I. Acerifoliella. *Ornix Acerifoliella*, Fitch, Reports 1 and 2, p. 269.* Head reddish-ochreous. General hue a fine metallic green; fore-wings without markings.



I am indebted to the kindness of Dr. Fitch for a specimen of this insect.

PLUTELLA, Schrank.

P. vigilaciella.† Head white, with fuscous before and behind the eyes. Labial palpi white; exterior of second joint fuscous. Antennæ ochreous, annulated with white, especially towards the tips. Thorax white; tegulæ dark fuscous. Fore-wings white, streaked with ochreous, with a dark ochreous streak at the base of the fold, margined on the inner side with dark brown. The inner border, from near the base to the tip of the wing, is closely dotted with dark brown; and on the costa, toward the tip, are a few dots of the same hue, and in the middle of the wing an elongated dark brown dot; cilia white and dark brown intermixed. Hind-wings dark gray. Abdomen dark gray.

P. limbipennella.‡ Head pale ochreous. Labial palpi whitish; tuft dark brown. Antennæ brown, slightly annu-

* Larva blotches the leaves of maple in August, and then cuts out cases forming holes of a nearly circular form in the leaves. The perfect insect appears in May (Fitch, l. c.). H. T. S.

† I received one specimen of this from Dr. Clemens; it is our *Porrectella*, L. H. T. S.

‡ I received two specimens of this from Dr. Clemens; it is our *Cruciferarum*, Zell. Dr. Clemens has a pencil note in the copy of his paper he sent me that it is the *Cerostoma Brassicella*? Fitch, Nox. Ins. Report, i. 170—5. *Cruciferarum* is truly cosmopolitan; I have received it from all parts of the globe. H. T. S.

lated with white. Thorax yellowish-white; tegulæ dark brown. Fore-wings cinereous-brown, dusted with dark brown, with a dark brown sinuated streak along the fold, and the inner marginal portion of the wing pale yellowish-white, with three rounded projections toward the fold. Hind-wings brown, with a purplish hue; cilia brownish-ochreous. Abdomen dark brown.

*P. mollipedella.** Head and thorax pale brownish-ochreous. Fore-wings pale brownish-ochreous, somewhat paler along the costa, and dotted with dark brown, with a fuscous, sinuated streak in the fold, *narrowly edged with ochreous-gray*. The inner marginal portion of the wing pale brownish-ochreous, with three projections toward the fold, *and the inner border dotted with dark brown* to the tip of the wing. Hind-wings dark gray; cilia brownish-ochreous.

Gracilaria, Zeller.

G. superbifrontella. Labial palpi yellow, tipped with brownish. Antennæ dull yellow, with very faint brownish rings. Head stramineous, tinged with reddish-violet on the forehead. Thorax stramineous, with tegulæ externally striped with reddish-violet. Fore-wings beautiful reddish-violet, with a shining stramineous patch on the inner margin at the base, and a large costal triangle of the same hue, reaching almost across the wing, and extending along the costa from the basal third, nearly to the apex. Hind-wings blackish-gray; cilia dark fuscous.

This insect must approach very closely the European *Swederella*.

The larva may be found, in the middle of July, in cones, on the leaves of *Hamamelis Virginica* (witch-hazel), and the imago appears early in August. The head of the larva is

* I have not seen this insect, but I should not be at all surprised if it should prove to be the ♀ of *Cruciferarum*, which has so often been looked on as a distinct species from the ♂. H. T. S.

pale green; body pale green, darker-coloured by the ingesta, with the tenth ring whitish, and the cervical shield pale brown.

G. fulgidella. Head and antennæ yellowish-white. Fore-wings white, with a silvery lustre, with a dark brown blotch near the base, not extended across the wing. Rather beyond the middle of the wing is a broad, dark brown band, with the exterior margin darkest, and *sharply angulated just above the inner margin.* The apical portion of the wing contains two rather broad, dark brown costal streaks, somewhat confluent in the middle of the wing, with a white costal spot between them. The extreme apex of the wing is dark brown, with a white costal streak before it, and opposite the costal white spot is another, at the interior angle, sometimes two not distinctly separated. Hind-wings dark fuscous; cilia the same.

G. venustella. Labial palpi white, with a blackish spot near the middle, and one near the tip. Antennæ dark brownish. Head silvery-white. Fore-wings dark cinereous, with a purplish hue, and white along the inner margin from the base to the middle. At the basal third of the wing is a small, white costal spot; three oblique, equidistant, slender white bands, dark-margined on both sides, the *first* about the middle of the wing, the *second* and *third* converging at the inner margin, with a white spot at the extreme apex, dark-margined on both sides by short streaks; cilia cinereous and white intermixed. Hind-wings blackish-gray; cilia rather paler.

G. strigifinitella. Labial palpi yellowish-white, dotted with dark brown, and with two dark-brown rings before the tip. Head and antennæ dull yellow. Fore-wings brownish-gray, suffused with dark brown, with the inner margin, from near the base to the middle, varied with white and dark brown; on the middle of costa a white streak, and a few small, costal, dark

brown blotches. Near the tip, on the inner margin, a slender, very oblique white streak, dark-margined on both sides, which crosses an oblique streak of the same hue from the costa, likewise dark-margined on both sides above the streak from the inner margin, and curved beneath, forming a white hinder-marginal line in the cilia, beneath the tip, and extending nearly to the apex of the wing. Beyond these, toward the base, in the apical third of the wing, are two oblique dark-brown costal streaks, with a short, white one between them, the first irregular and somewhat diffused, the second margined behind with brownish-yellow. Apical portion of the wing dark brown. Hind-wings dark brown; cilia somewhat paler.

G. violacella. Head and face pale yellowish, tinged with reddish-violet. Labial palpi yellowish-white, annulated at the tip with brownish. Fore-wings with the external half pale, shining, cream-yellow, interior half suffused with a pale violet iridescence. About the middle of the costa are a few separated blackish-brown dots, and in the middle of the wing a blackish-brown comma spot, and near the tip an atom of the same hue. The posterior part of the fold somewhat suffused with fuscous; cilia reddish-fuscous. Hind-wings dark gray, with a reddish tinge; cilia reddish-fuscous.

Argyresthia, Hübner.

*A. oreasella.** Labial palpi silvery-white. Head silvery-white; forehead and face faintly tinged with pale golden-brown. Antennæ silvery, annulated with dark brown. Fore-wings silvery-white, with a pale golden-brown streak at the base of the costa. About the middle of the wing is an oblique, dark golden-brown band, broadest on the inner margin, and tapering to the costa, beyond which is a narrower, oblique band of the same hue produced in the middle, as a rather broad, somewhat curved streak toward

* I received one specimen of this from Dr. Clemens; it is our *Andereggiella*, Dup. H. T. S.

the tip, behind which it is arrested; cilia pale golden-brown, with a darker hinder-marginal line. Hind-wings dark gray; cilia the same.

Another specimen, on the middle of the inner margin, has a rectangular, golden-brown patch, not extended to the costa, with an irregular, obliquely placed patch of the same hue on the inner margin, near the tip, and slightly connected with a small costal patch placed midway between the patches, on the inner margin. The tip of the wing is golden-brown, and is scarcely connected with the second patch by a posteriorly produced portion.

Taken on wing, June, July.

Ornix, Zeller.

Cl typ no 50 Lost

O. trepidella. Labial palpi yellowish-white, annulated with dark brown near the tip. Head dark brown. Antennæ dark brown, slightly annulated with whitish. Fore-wings dark purplish, dusted with dark brown. Along the costa are several short, oblique, obscure yellowish streaks, with dark brown streaks between, extending from the middle of the wing to the tip, obliquely placed till near the apex. Hind-wings dark gray; cilia the same.

Cl typ no 51

O. festinella. Labial palpi silvery-gray, with the second joint at the apex annulated with dark brownish. Head dull brownish-gray. Antennæ dark brown, annulated with whitish. Fore-wings grayish, somewhat suffused with brownish from the base to the middle, with the costa at base dark brown. From the middle to the tip freely dusted with dark brown, with several whitish, rather obscure costal streaks, becoming plainer near the tip, and two or three on the inner margin, near the tip. At the tip are a few dark brown scales, with the cilia of extreme apex white; cilia grayish, with dark brown tipped scales intermixed. Hind-wings pale gray; cilia similar. Abdomen blackish, tipped with yellowish-ochreous.

Cl typ no 52 Lost! not found under no 222 see note

O. cratægifoliella. Labial palpi whitish. Head dark

brown and gray intermixed. Antennæ dark brown, faintly annulated with whitish. Fore-wings dark brown, with a purplish hue. Along the inner margin, from the base to the anal angle, whitish, dusted with dark brownish. In the fold at the base is a dark brown streak, and a small blotch of the same hue beyond the middle, nearly reaching to the inner margin. Toward the tip are a few whitish, costal streaks, and at the apex a small, round, dark-brown spot, in a whitish patch, with a circular, dark-brown apical line behind it; cilia blackish-gray. Hind-wings blackish-gray; cilia rather paler. Abdomen blackish, tipped with dull yellow.

The larva mines the leaves of *Cratægus tomentosa* (black thorn), in September, and becomes a pupa early in October, weaving a reddish-brown cocoon in a turned-down edge of the leaf. The pupa case is thrust from the end of the cocoon at maturity, the imago appearing early in May. There is, doubtless, a summer brood, but I have not sought for it. The head of the larva is brown; the body greenish-white, with the dorsum reddish-brown.

Hyponomeuta, Zeller.

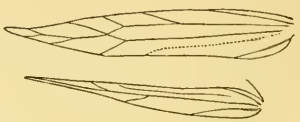
Cephph 53. *H. multipunctella.* Labial palpi, head, antennæ and thorax white. Thorax with a black spot on the front of tegulæ, and a few spots of the same hue on the disk. Fore-wings white, with the costa at the base blackish, and longitudinal rows of distinct black dots; two of which, one along the inner margin, and one along the fold, are very plain. Hind-wings blackish-gray.

Bedellia ? Stainton.

This genus is represented by a single species, in Europe. It was, therefore, a surprise to myself when I found the species described below, corresponded to the European not only in structure but in ornamentation. There is, however, a slight difference in the neuration of the posterior wings of the two insects when compared with Mr. Stainton's delinea-

tion, and hence I give a full generic diagnosis of the American species.

The anterior wings are narrow and pointed, and the posterior very narrow, almost setiform. The discoidal cell of the anterior is acute behind, with *three* subcosto-marginal nervules, the last of which arises at the apex of the cell, together with the apical nervule, which sends off, at about its middle, a nervulet to the inner margin, and is furcate near the tip of the wing. The median nervure sends only a single branch to the inner margin. Both the costal and submedian nervures are short. The posterior wings without discoidal cell; the costal nervure is very short; the subcostal runs through the middle of the wing, and sends a branch to the inner margin,* rather beyond the middle, and is furcate at its extremity, the lower branch proceeding to the tip, along the inner margin. Above the subcostal nervure is a rather indistinct parallel fold. The median nervure is long, well marked, and simple; placed near the inner margin of the wing.



Head rough above, and in front, between the antennæ, almost tufted; face smooth, moderately broad and rounded. Ocelli none. Eyes moderately prominent, round, and partially covered with hairs from above. Antennæ as long as the anterior wings, filiform, simple; basal joint squamose. No maxillary palpi. Labial palpi very short, pointed, and rather porrected, with two joints only distinguishable. Tongue naked and short.

B. Staintoniella.† Labial palpi and head ochreous, the latter somewhat reddish-ochreous above. Antennæ ochreous.

* This "branch to the inner margin, rather beyond the middle," I do not see in my denuded specimen of a British *B. somnulentella*, Zell., and this is probably the slight difference in the neuration of the posterior wings to which Dr. Clemens alludes. H. T. S.

† I received three specimens of this from Dr. Clemens; it is certainly our *B. somnulentella*, Zell., only a little smaller. In October, 1869, I also received

Fore-wings ochreous, dusted with dark fuscous, but leaving a streak of the general hue along the inner margin. Hind-wings dark gray; cilia rather dark ochreous. Abdomen dark brown and ochreous mixed.

Cosmiotes.*

Fore-wings rather narrowly ovate-lanceolate, with the discoidal cell closed acutely. The subcostal nervure is attenuated toward the base of the wing, and subdivides into three marginal branches, the first of which arises at about its middle, and sends from the angle of the disk a *trifid branch*, which is either forked on the costa by an exceeding short branch before† the tip, and gives rise at about its middle to a branch to the inner margin, or is trifid at its extreme tip. The median is two or three-branched near its end. The submedian is simple. Hind-wings are without a discoidal cell; and the costal nervure is moderately long. The subcostal runs through the middle of the wing, (is central,) and is furcate near the tip. The median is well indicated, with *two or three* short, approximated branches about the middle of the inner margin.

Size very small.‡ Head smooth. Without ocelli. Forehead rather elevated and rounded; face rounded and nearly equally broad. Eyes very small, oval and somewhat sunken, scarcely visible in front. Labial palpi moderately long and slender, smooth, pointed and somewhat recurved; the second joint slightly compressed laterally. No maxillary palpi.

the same insect from the late Mr. B. D. Walsh of Rock Island, Illinois, who had bred it from blotch-mines on the leaves of *Ipomœa purpurea*. His specimens, and also some I have received from Texas, collected there by Mr. Belfrage, all agree in size with Dr. Clemens' specimens, and are smaller than our European insect. H. T. S.

* Afterwards recognized as the genus *Elachista*. H. T. S.

† Dr. Clemens has erased this word "before" in the copy of his paper sent me, and has marked in the margin in pencil "behind." "Behind the tip" could only, as I understand the words, be in the apical cilia. H. T. S.

‡ A most unfortunate definition, as Dr. Clemens nowhere mentions the size. H. T. S.

Antennæ inserted laterally; basal joint short and rather thick, with a few cilia at the base before; stalk simple, slender, and scarcely as long as the body. Tongue naked, and about as long as the labial palpi.

§ *Median vein of hind-wings two-branched. Apical vein trifid at the tip.*

Lost. *C. illectella.* Labial palpi and head yellowish-brown. Antennæ fuscous. Fore-wings fuscous, dusted with dark brown, with a broad, transverse, silvery-white band near the middle of the wing, a spot of the same hue on the costa near the tip, and an opposite one on the inner margin nearly joining it in the middle of the wing. The extreme apex of the wing has a silvery streak in the cilia, margined behind with a row of dark-brown atoms on their ends. Hind-wings grayish-fuscous; cilia the same.

§§ *Median vein of hind-wing three-branched. Apical vein forked on the costa, with a nervulet to the inner margin.*

C. maculoscella. Labial palpi dull yellowish. Head dark brownish. Antennæ fuscous. Fore-wings shining silvery-grayish, suffused with dark golden-brown, with a rather obscure silvery band in the middle of the wing and a silvery spot on the costa just before* the tip. The extreme apical portion of the wing is blackish-brown; cilia grayish-brown. Hind-wings grayish, dusted with dark brown; cilia grayish-brown.

§§§ *Medio-posterior and central veins opposite the space between the second and third subcosto-marginals.*

C. madarella. Head dark silvery-gray. Antennæ dark brown, yellowish-white at the tips. Fore-wings dark golden-

* Here again Dr. Clemens has erased this word "before" in the copy of his paper sent me, and has marked in the margin in pencil "behind." See note †, p. 97. H. T. S.

brown, silvery-gray at the base, with an oblique pale-golden band near the middle of the wing, the costal portion being nearest the base. On the costa, near the tip, is a pale-golden spot, with a spot of the same hue opposite on the inner margin, and one in the middle of the wing before* the tip; cilia pale brown, dotted with dark brown. Hind-wings grayish-brown; cilia rather darker.

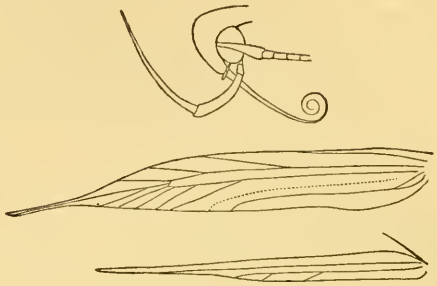
Cosmopteryx? Hübner.

The anterior wings are rather narrow and *slenderly caudate*. The discoidal cell is elongate and very narrow, and *closed acutely behind* with *three* subcosto-marginal nervules, the first arising about the middle of the wing. The median sends *four* nervules to the inner margin, the first arising midway between the first and second subcostal branches, and the last from the apex of the discoidal cell, together with an apical branch, which almost immediately sends off a nervulet to the inner margin, whilst the apical proceeds through the middle of the slender, acicular, caudate extremity to its tip. At the basal third of the wing, the subcostal nervure becomes attenuated. The costal is nearly coincident with the margin; the submedian furcate at the base. The posterior wings are narrow, almost setiform, and without a discoidal cell. The submedian is central, simple and faintly indicated until near the tip, when it becomes furcate. The median, which is better defined, runs near the inner margin, and subdivides into *three branches* to the inner margin. The costal is coincident with the marginal.

Head perfectly smooth, advanced, long, and flattened above; forehead very convex and globose; face full, rounded and somewhat retreating. Ocelli none. Eyes flattened, scarcely visible in front, oval. Antennæ nearly as long as the anterior wings; basal joint long, slender, and clavate; stalk setaceous and simple. *Maxillary palpi extremely short, scarcely perceptible.* Labial palpi very long, slender, much recurved and pointed; the second joint somewhat compressed

* See note in preceding page.

toward the end, shorter than the third. Tongue scaled, as long as the thorax beneath.



*C.? gemmiferella.** Labial palpi dark greenish-brown, with a silvery stripe on the front of the third joint, and another behind, continued to the second joint. Face, head and thorax dark greenish-brown, with a narrow, central, silvery line continued to the thorax, and one of the same hue above the eyes on each side. Antennæ dark greenish-brown, with two silvery lines on the basal joint, the stalk annulated with silvery, and a broad, silvery ring before the tip, which is likewise silvery. Fore-wings dark greenish-brown to the middle, and from the apical third to the tip, with an orange-coloured patch rather beyond the middle of the wing, extended across the wing, and a little produced along the costa behind, having a large, transverse, oval, smooth patch of elevated

* The following remark has already appeared in the 9th volume of "The Entomologist's Weekly Intelligencer," p. 31:—"Dr. Clemens has very liberally forwarded me six specimens of his *Cosmopteryx;* but I find on close examination, that only four of them truly belong to *Gemmiferella*, the other two being manifestly a distinct, though closely allied, species, which, though possessing the three short longitudinal streaks near the base in place of the fascia, differs in the following respects:—The ground colour of the anterior wings is darker, the orange fascia is paler, not so reddish, its margins are pale golden, instead of silvery-violet and its hind margin is almost straight, and thus very different from that in *C. gemmiferella;* finally the apical streak is continuous, not interrupted, and of a silvery-white throughout. I have much pleasure in naming this species, after its captor, *Cosmopteryx Clemensella.*"

The exp. al. of *Clemensella* is 4½ lines. H. T. S.

silvery scales, somewhat violet-hued, on its internal margin, the patch extending nearly across the wing; another smaller and similar, nearly round one behind it, on the inner margin, and another small one on the costa, behind the produced portion, with a white costal streak above it in the cilia. All these patches are somewhat black-margined. Near the base of the wing are three short, silvery streaks, one nearly on the disk, one near the fold beneath it, and an oblique one above it, near the costa. The cilia of the extreme apex is silvery-white, black-margined above, with a violet-silvery scale in the middle of the wing before the tip. The inner margin, at the base of the wing, is silvery. Hind-wings dark brown; cilia somewhat paler.*

The ornamentation of this insect is very elegant. Taken on wing in June, July.

Eudarcia.

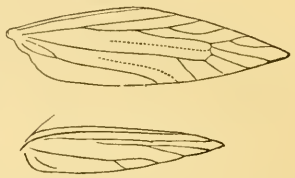
Head and face rough. Without ocelli. Eyes small, hemispherical, quite prominent, with a naked space above? Labial palpi short, rather smooth, and separated; the third joint somewhat less thick than the second, and nearly as long. Maxillary palpi long, folded and five or six-jointed. Antennæ, basal joint moderately long, approximated on the front, simple and full as long as the anterior wings. Tongue naked and very short, scarcely as long as the labial palpi, and not reaching beyond the front.

Fore-wings with the subcostal nervure attenuated at the

* In the 9th volume of "The Entomologist's Weekly Intelligencer," p. 31, I have noticed, in reference to this species, that it "is intermediate between *C. Scribaiella* and the *Drurycella* group;" and that the essential characters are,—"Anterior wings dark greenish-brown, with three short longitudinal silvery streaks *near the base* (these represent the fascia we find in *Eximia* and *Schmidiella*), with a *reddish*-orange fascia, edged with silvery-violet, in the middle (*this fascia is considerably broadest on the costa, its hinder margin being formed by two silvery-violet spots, which are by no means opposite*); at the apex is a short silvery-white scale, preceded by a violet-silvery spot, *with which it is not connected.*"

The exp. al. of *C. gemmiferella* is 5 lines. H. T. S.

base; at the basal third arises a long marginal branch, and about its middle a furcate branch, and thence the subcostal is faintly indicated to the discal nervure, beyond which it reappears as a furcate branch to the costa behind the tip. The discoidal cell is closed, and sends a single branch to the inner margin behind the tip. The median subdivides into three approximate branches. The submedian is furcate at the base. In the hind-wing the costal nervure is rather long and distinct; subcostal simple, and obsolete from the middle to the base; discoidal cell *unclosed*, with an independent discal nervule, faintly indicated from the base, and *furcate* at the apical third. The median strongly indicated and bifid rather beyond the middle of the inner margin.



Cet. typ. No. 59. *E. simulatricella.* Head brownish-ochreous. Antennæ ochreous, annulated with dark brown. Fore-wings dark brownish, with a white band about the basal third of the wing, a white spot on the costa, near the middle, and one on the inner margin, a little behind it, and a white transverse streak near the tip. Hind-wings dark brown, cilia the same.

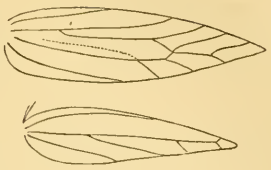
This insect has considerable resemblance to an *Incurvaria.* Its neuration, however, places it in a very distinct group.

Antispila, Herrich-Schäffer, Frey.

Cet. typ. No. 60. *A. nysæfoliella.** Head above dark brown. *Face, labial palpi and fore-feet shining yellowish-ochreous.* Antennæ dark brown; basal joint yellowish-ochreous. Fore-wings dark brown, with a greenish reflection, and the base with a bright coppery hue. Near the base is a rather broad,

* It should be *Nyssæfoliella;* the food plant is *Nyssa multiflora* (Black or Sour Gum, or Tupelo). H. T. S.

bright-golden band, broadest on the inner margin, where it is nearest the base, and *constricted at the fold of the wing;* a spot of the same hue on the costa, at the apical third of the wing, and one on the inner margin, midway between this and the band; cilia somewhat coppery, and rather grayish at the inner angle. Hind-wings purple-brown; cilia grayish-ochreous.



The larva mines the leaves of *Nysa* multiflora* in September. The head is dark brown; first segment dark brownish; body very pale green, with dark atoms along the dorsum; ventral surface with a line of two black spots. After the last moulting the first segment is black, and the dorsal spots become a black, vascular line. When full fed the larva weaves an oval cocoon within the mine, and cutting the two skins of the leaf into a correspondent form, permits it to fall to the ground. There is thus left an oval hole in the deserted mine. The imagos appear during the following May.

A. cornifoliella. Head, face, labial palpi, and fore-feet dark brown. Antennæ dark brown; basal joint somewhat ochreous. Fore-wings rather dull dark brown, with a coppery hue. Near the base is a rather narrow, golden band, *not constricted on the fold, and rather indistinct toward the costa,* where it is somewhat suffused with a coppery hue, and nearest the base on the inner margin. At the apical third of the wing is a small golden spot, and nearly opposite, on the inner margin, another of the same hue, with the hinder portion of the wing tinged with a bright reddish coppery hue; cilia dark grayish. Hind-wings purplish-brown; cilia somewhat paler, with a coppery hue.

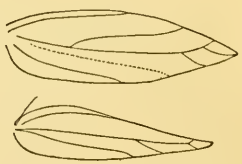
The larva mines the leaves of *Cornus florida* in September. It may possibly be a variation of *Nysæfoliella.*

* See note in preceding page.

The larvæ of the insects are very like each other, but I don't know whether that of *Cornifoliella* undergoes the same change of coloration after the last moulting as that of *Nysæfoliella*. The head and shield dark brown; body nearly white, with seven minute, black points along the dorsum, and eight on the ventral surface, somewhat larger, and more distinct. Its mode of preparing for pupation is the same as the previous species, but whilst the individuals of *Nysæfoliella* on a single tree are almost innumerable, those of *Cornifoliella* are not abundant.

Aspidisca.

Fore-wings with no discoidal cell. The subcostal nervule traverses the middle of the wing, attenuated from the base to the basal third, where it gives origin to a long, marginal branch, which reaches the costa at the apical third of the wing; near the tip it subdivides into three short branches, one of which is delivered to the costa behind the tip,* one to the tip, without attaining the extreme apex, and one to the inner margin, somewhat behind the second marginal branch. *The median nervure is wanting.* The submedian simple. Hind-wings with no discoidal cell. The subcostal nervure is central and attenuated towards the base, and at about its apical third delivers a branch to the inner margin and is bifid behind the tip of the wing. The median is simple. The submedian obsolete or wanting.



Size extremely small. Head and face smooth, covered with closely appressed scales. Face rather broad, and somewhat produced beneath into a point. Forehead rounded. Ocelli none. Eyes extremely small, not visible from above, and scarcely visible in front. Antennæ held extended at the

* I am again perfectly at a loss to solve the meaning of this expression "behind the tip." H. T. S.

sides, very short, scarcely *one-half* as long as the anterior wings, rather thick, obtuse, and roughened with scales. Maxillary palpi none. Labial palpi extremely short and slender, much separated.* Tongue naked and scarcely as long as the anterior coxæ.*

A. splendoriferella.† Head golden. Antennæ fuscous, tinged with golden. Fore-wings, from the base to the middle, leaden-gray, with a splendent lustre, and from the middle to the tip golden, with a broad, nearly straight, metallic, silvery streak, extending from the costa near the tip to the middle of the wing, and dark-margined on both sides. This is nearly joined by a dorsal streak of the same hue, almost opposite to it, with converging dark margins, and with a blotch of dark-brown scales adjoining it behind. In the costo-apical cilia is a short, blackish-brown streak, parallel to the dark margin of the silvery costal streak.

At the tip is a black, apical spot, with metallic, silvery scales in its centre, and a few silvery scales in the cilia above and beneath it. A blackish-brown hinder-marginal line in the cilia, interrupted by a silvery streak in the cilia beneath the apical spot, and the cilia yellowish-brown. Hind-wings leaden gray: cilia yellowish-brown.

* See corrections mentioned in letter of June 23rd, 1860 (*ante*, p. 36). In the original paper we read "Labial palpi none. Tongue none." H. T. S.

† There is a wonderful superficial resemblance between this insect and *Cemiostoma scitella*, but the dark lines in the cilia are in *Aspidisca splendoriferella* represented by only a single line, which projects straight out at the apex, starting from a black apical spot, which is bordered internally by two short silvery streaks, one above and one below, which, by their union, form a silvery semicircle, separating the apical black spot from the rest of the wing; the basal portion of the wing is glossy pale-gray, not with the decided bluish tinge we find in *C. scitella;* a little beyond the middle are two obliquely-placed silvery streaks, sloping posteriorly, and forming, by their union, an angulated silvery fascia; the space between them and the subapical silvery arch is tawny. Exp. al. 2 lines, or sometimes rather less.

I had the pleasure of breeding two specimens of this insect in the spring of 1860, from pupæ sent me by Dr. Clemens, October, 1859. (See *ante*, pp. 23, 31, 32.) H. T. S.

The larva mines the leaves of *Cratægus tomentosa* early in September. The mine appears at first as a very narrow line, and is subsequently expanded into a small, transparent blotch. At maturity the larva weaves a cocoon between the cuticles, and cuts out a small oval disk. This is sometimes carried quite a distance, and is ultimately secured to some object by one of its ends tied down on a little button of white silk. It enters the pupa state toward the latter part of September, and appears as an imago in early spring.

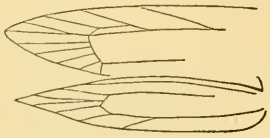
The mature larva has a head much smaller than the first ring, rounded above, and elliptical. The body is flattened, and tapers posteriorly from the anterior rings. The segments are rather deeply incised, the thoracic obtusely rounded at the sides, and the rest with a minute lateral nodule or mammilla. It is without legs or prolegs, but on the second and third thoracic rings, on both the dorsal and ventral surfaces, are spots or cup-like depressions, one on each side, capable of being contracted and expanded. So, likewise, from the sixth to the ninth inclusive, on the ventral surface are transversely placed oval spots, similar to the thoracic, and one on each segment. On the segment next the last is a protuberance, both dorsal and ventral, with two cup-like depressions on each surface. These are not supplied with hooks, and, if they are substitutes for feet, must act like suckers. They are all pale brown. The head is dark brown; the body brown, with blackish along the dorsal and ventral surfaces.

When the larvæ are young, it is extremely difficult to discover their mines, and the transparent blotch is not much larger than the cocoon, leaving a space in which the "frass" is collected.

Diachorisia.

Fore-wings pointed, narrowly ovate-lanceolate; discoidal cell closed behind by a very faintly indicated nervure, with a faintly indicated secondary cell. The subcostal nervure obscurely indicated from the secondary cell to the base of the

wing, with a long and distinct marginal nervule from near the base, one from the middle of the secondary cell, and three from the end of it to the costa. Three nervules from the discal nervure to the inner margin beneath the tip. The median without branches; beyond the discal it proceeds to the inner margin, as a single short vein; perhaps it may be bifid. The submedian is simple. Hind-wings lanceolate, clothed with scales, with the discoidal cell closed by a very faintly indicated nervure. The costal nervure is long, and extends nearly to the tip of the wing. The subcostal is simple, and wanting from near the origin of the discal nervure, where it is slightly produced inwardly, but well indicated thence to near the tip. The discal nervure gives rise to a discal branch, which quickly becomes bifid, and its branches well defined near to the tip, above and beneath. The median is well indicated, and is three-branched, the last very faintly connected with the second. No submedian nervure.*



Size very small. Head rough and hairy above and in front. Ocelli none. Eyes rather large, round and salient, not set on a naked circular portion of the head, nor with a naked space above the eyes. Antennæ about one-half as long as the anterior wings, inserted laterally, and microscopically pubescent beneath; basal joint moderately long, stalk roughened with scales. Maxillary palpi rather long and folded. Labial palpi moderate, slender, smooth, cylindrical, separated and somewhat drooping; the third joint nearly as long as the second, which has a few bristles at its end and beneath. Tongue ?

Cl typ. h. 64 *D. velatella.* Labial palpi dark brownish. Head brownish-gray. Antennæ grayish-fuscous, with the basal joint whitish,

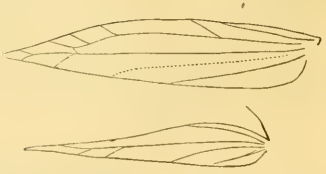
* The sketch of the neuration I received from Dr. Clemens has apparently been made from a specimen only partially denuded, and is not therefore complete. H. T. S.

having a blackish, external streak. Fore-wings whitish, dusted with dark fuscous, with a few dark fuscous spots along the costa, and one of the same hue about the middle of the disk, beneath which on the fold is another of the same hue. Toward the apex, in the middle of the wing, beneath the last costal spot, is a small dark fuscous spot, sometimes connected toward the base of the wing with a dusted streak of the same hue; cilia whitish, somewhat dotted with dark fuscous. Hind-wings grayish-brown; cilia the same. Alar exp. 9,5 m.m.

The relationship of this insect to INCURVARIA and its allied genera, especially to *Acerifoliella* and to EUDARCIA, is very obvious.

BUCCULATRIX? Hübner.

The anterior wings lanceolate; the discal cell is closed acutely behind, with the subcostal nervure faintly indicated from the middle of the wing to the base, and sending *four* nervules to the costa, the first about the basal third, and its origin from the subcostal faintly indicated; the three others arising near the apical portion of the wing, with the subcostal between the second and last rather faintly indicated; the third nervule scarcely noticeable, and the last branch arising from the apex of the discoidal cell. The median is strongly indicated throughout, and sends off to the inner margin, at its posterior end, a very faintly indicated branch, whilst the apical branch, which appears to be a continuation of it, becomes bifid behind the tip of the wing. The posterior are narrowly lanceolate, without discoidal cell. The subcostal nervure is central, and subdivides beyond the middle of the wing into three branches, two to the inner margin, and one along the exterior margin to the tip. The median nervule is simple.



Size extremely small. Head rough, tufted in the middle. Face smooth and retreating. Eyes salient, visible in front.

Antennæ with a spreading basal eye-cap, expanded above the eyes; stalk very slender, simple, scarcely more than one-half so long as the body. *No labial or maxillary palpi.* Tongue naked, very short, not one-half as long as the anterior coxæ.

Cryptolechia B.? *coronatella.* Face yellowish-white. The head with the tuft pale orange-chrome: the eye-caps pale yellow, touched behind with orange-chrome. Antennæ yellow, dotted above with dark brown. Fore-wings pale orange-chrome, with a whitish patch near the base above the fold, one nearly opposite, on the inner margin, and one about the middle of the wing, on the costa. Near the tip of the wing is a rather indistinct, narrow, whitish band, becoming somewhat diffuse on the inner margin, about the middle of the cilia: extreme apex of the wing whitish, mixed with scales of the general hue; cilia grayish-fulvous. Hind-wings dark gray; cilia fulvous-gray. Abdomen pale orange-chrome, with a dark-brownish stripe along the dorsum varied with fulvous.

[Here follow descriptions of two *Macro-Lepidoptera*:
viz., of one of the HERMINIDÆ, *Epipaschia superatalis*
and
of one of the ÆGERIIDÆ, *Trochilium Acerni.*]

NOTE. In the November number, 1859, the following corrections should be made.

In the first line of the note on p. 317, *preceding* should read *succeeding.**

In Division II. of the table of species, on p. 318, *an* should read *no.*†

On page 327, for *vitegenella* read *vitigenella.*‡

* See *ante*, p. 62, note 1.
† See *ante*, p. 65, note *.
‡ See *ante*, p. 84, note *.

[Extracted from the Proceedings of the Academy of Natural Sciences of Philadelphia for May, 1860, pp. 156—174.]

CONTRIBUTIONS TO AMERICAN LEPIDOPTEROLOGY.—No. 4.

BY BRACKENRIDGE CLEMENS, M.D.

[The first five pages are devoted to descriptions of Macro-Lepidoptera, viz.:—

Saturnia galbina,
Pimela lanuginosa,
Limacodes laticlavia,
Adoneta voluta,
Empretia stimulea, } *Limacodidæ.*
E. pœnulata,
Nochelia tardigrada,
Attacus splendida,
Hypercompa interrupto-marginata.]

Tineina.

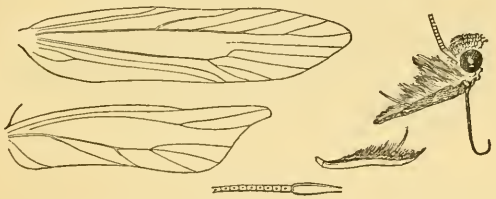
Anorthosia.

Anterior wings rather narrow, and somewhat lanceolate. The subcostal nervure is nearly straight, and gives off from the disk, which is unclosed, three marginal nervules and becomes bifid before the tip. The discal nervule is independent. The median is four-branched, its last nervule is bifid, and arises opposite the middle of the origins of the second and third subcosto-marginals. The submedian is bifid at its base.

Hind-wings somewhat emarginate behind the tip on the external margin, and rather deeply emarginate beneath the tip. Disk unclosed. Subcostal nervure bifid from the end

of the disk. This discal nervure is transferred to the median side, and the median nervure is three-branched.

Head and face smooth; vertex elongated, with long loose scales overlapping in the middle. Forehead rounded. Ocelli very small. Eyes small, round and salient. Antennæ about one-third less long than the anterior wings, basal joint long and slender, the stalk slightly denticulated beneath. Maxillary palpi extremely small. Labial palpi smooth, long and porrected, their development being almost entirely in the second joint, *which is supplied above with long hairs capable of being erected*, although usually decumbent, and with the *third joint* short, very slender, smooth and pointed, *arising nearly erectly at the apical third of the second*, and is likewise capable of being erected or depressed. Tongue scaled at the base and about as long as the labial palpi.



*h. 66. A. punctipennella.** Labial palpi and head rather dark ochreous, the former dark brownish externally. Antennæ ochreous, annulated with dark brown. Fore-wings rather dark ochreous, sometimes dusted with dark brownish, with three pairs of blackish-brown dots along the fold, the first near the base of the wing, the second rather above the middle, and the third near its end. One dot of each of the latter pairs is in the fold, the other above it obliquely. The costa at the base, and beyond the middle, is touched with blackish, with the hinder portion of the wing dotted and dusted with dark brown, especially along the hinder margin.

* Of this species I received two specimens from Dr. Clemens; it seems to be allied to *Cleodora*, and I do not feel confident that it is generically distinct. The exp. al. is 5¼ lines. H. T. S.

Cilia ochreous. Hind-wings shining, blackish-gray, cilia the same. Abdomen blackish.

GELECHIA, Zeller.

G. cerealella. *Anacampsis* (*Butalis*) *cerealella*, Harris, Treat. on Ins., 2nd ed., p. 392. Head and face dull ochreous. Labial palpi pale ochreous, with fuscous ring at the tip and a slight fuscous spot on the middle of the second joint. Fore-wings pale, shining ochreous, with a fuscous streak in the fold toward the base and a few fuscous scales toward the tip of the wing on the margin; cilia grayish-ochreous. Hind-wings grayish-ochreous, cilia the same.

This insect has doubtless been introduced into this country from Europe. My own specimens were obtained from the W. D. Porter wheat, distributed by the Patent Office at Washington city. The seed of this wheat was originally procured from Mount Olympus in Asia, and from two heads of this as a beginning was grown in the District of Columbia the grain distributed in the years 1854 and 1855. The insect is probably common in the District.

*G. agrimoniella.** Labial palpi yellowish. Eyes crimson. Antennæ yellowish, annulated with black. Head, thorax and fore-wings blackish, somewhat suffused with a greenish hue, the latter black beyond the middle, with a pale yellow band, somewhat hooked on the costa, at the apical third of the wing. Hind-wings blackish-brown, cilia the same.

The larva may be found about the middle of June, nearly full fed, in the leaves of Agrimony (*Agrimonia Eupatoria*), which it rolls and binds together with silken threads.

The body of the full grown larva is coloured obscure

* Of this I received six specimens from Dr. Clemens. The exp. al. is 5½ lines. The fascia, which curves a little outwards on the costa, is represented on the underside as a distinct, almost triangular costal spot—the basal portion of the anterior wings is much more decidedly paler than the apical portion in our European *Tæniolella*. The food-plant of the American species is very interesting, all the species of the group in Europe, as far as known, feeding on *Leguminosæ*. H. T. S.

green, dotted with black dots. Head and shield pale brown. The young larva is flesh-coloured and dotted with dark coloured dots. The pupa is contained in a slight cocoon, sometimes woven between the leaves of its food plant, but usually it is abandoned to construct it. The pupa case is not thrust from the cocoon at the maturity of the insect.

The June brood of larvæ become imagos during the latter part of June, or the beginning of July.

Fore-wings scarcely pointed. Secondary cell faintly indicated. Subcosto-apical vein forked. The last branch of median bifid. Hind-wings emarginate before the tip and slightly beneath it, with an intercostal cell at the base.

G.? flavocostella. Labial palpi wanting. Head dull reddish-yellow. Antennæ blackish-brown, yellowish toward the base. Thorax, disk black, front and sides dull yellow. Fore-wings black, with a broad, pale yellow costal streak, extending from the base nearly to the tip of the wing, undulating from the base to the middle of the wing and dilated into an angle at the apical third, with a faint, yellowish streak produced from the apex of the angle toward the inner angle of the wing. Hind-wings dark brown, cilia the same.

This insect does not, probably, belong to the genus under which it is placed. As the labial palpi are wanting, I include it here from its general structure and appearance, not knowing otherwise where to place it.

One specimen from A. J. Packard, jun., of Brunswick, Maine.

The second joint of labial palpi moderately thickened. Hind-wings deeply emarginate beneath the tip, which is produced.

*G.? roseosuffusella.** Labial palpi, second joint whitish,

* Of this I received three specimens from Dr. Clemens; it is allied to *G. decurtella* and *G. subdecurtella*. The exp. al. is 5 lines. H. T. S.

spotted with dark fuscous; the third dark fuscous, annulated with two white rings. Head and thorax ochreous, tegulæ with a dark-brown spot in front. Antennæ dark fuscous, annulated with whitish. Fore-wings dark brown, ochreous along the inner margin, where it is suffused with roseate. At the base of the wing is a white spot containing a dark-brown dot, and near the base an oblique white band. About the middle of the wing is a large white spot or indistinct broad band, irrorated with dark brownish and tinted with roseate on the inner margin. Near the tip is a costal white spot and a roseate spot opposite on the inner margin, and a whitish spot at the tip. Cilia brownish-gray. Hind-wings dark fuscous-gray, cilia fuscous. Feet annulated with white.

Fore-wings scarcely pointed. Hind-wings slightly emarginate beneath the tip, with an intercostal cell at the base.

*G. Rhoifructella.** Head, face and thorax grayish-fuscous. Labial palpi rather dark ochreous. Antennæ ochreous, annulated with black. Fore-wings grayish-fuscous, dusted with dark brown, and with four dark-fuscous dots, one near the base of the fold, two near the middle of the wing (one on the fold and one above it), and one on the end of the disk. Near the end of the wing is an indistinct grayish band. Hind-wings fuscous, cilia the same.

The larvæ may be found in April or early in May, in the fruit spikes of sumach (*Rhus Typhina*), where they feed on the crimson hairs and exterior envelope of the drupes, without however eating the drupes themselves. The larvæ are concealed in galleries formed in the fruit spikes, and their presence is indicated by strings of "frass" clinging to the

* Of this I received three specimens from Dr. Clemens; it has considerable resemblance with our *G. populella*, but the anterior wings are broader and blunter, and the anterior segments of the abdomen are not pale. The exp. al. is 8 lines. H. T. S.

exterior. The cocoon is a slight silken web woven among the "frass" near the surface. The larva is immaculate, and varies in colour, from dark reddish-brown to a pale brown, dotted with rows of darker-coloured dots, each giving rise to a hair; the head is brown and the shield blackish. The imago appears about the middle of June.

Size small. Fore-wings rather lanceolate and pointed. Hind-wings deeply emarginate beneath the tip, which is produced. The second joint of labial palpi somewhat thickened.

*G.? rubidella.** Head and face ochreous. Labial palpi yellowish-white, with two deep fuscous spots on the middle joint, and two blackish-brown rings on the terminal one, a narrow one near its base, and a broad one near the tip, while the tip is blackish. Antennæ deep fuscous, annulated with white. Thorax fuscous, deep fuscous in front. Fore-wings roseate, dusted with deep fuscous, with a brownish-ochreous streak along the inner margin from the base to nearly the middle of the wing, and interrupted about its middle by a roseate hue. At the basal third of the wing is an oblique deep fuscous band, extending from the costa to the fold, and beyond the middle of the costa is a spot of the same hue, joined toward the inner margin by a brownish-ochreous spot. The apical portion of the wing much dusted with deep fuscous; cilia ochreous, with a fuscous hinder-marginal line. Hind-wings blackish-gray; cilia somewhat paler. Feet rather pale ochreous, spotted with deep fuscous.

G. flexurella. Head and face grayish-fuscous. Labial palpi, second joint dark fuscous, terminal joint white with a blackish ring at the base, and one near the tip. Antennæ whitish, annulated with dark fuscous. Fore-wings grayish-

* Of this I received three specimens from Dr. Clemens; it is somewhat allied to our *G. ericinella*, but is smaller and the anterior wings are narrower. The exp. al. is 4 lines. H. T. S.

fuscous, with a pale-grayish band near the apex, margined internally on the costa by a blackish-brown spot, with another of the same hue about the middle of the costa and another on the costa near the base. Near the base of the fold is a rather faint dark-brownish spot, and the wing is sprinkled with dark-brown atoms. Hind-wings dark fuscous, cilia ochreous-gray.

Variety? Fore-wings smoky fuscous, with a pale grayish-band near the tip, broadest and most distinct on the costa, margined broadly internally across the wing with dark brown, with a pale-grayish spot between it and a dark-brown spot on the middle of the costa. In the middle of the wing are two dark-brown spots, one on the basal part of the fold, and a small one on the costa above it of the same hue. Hind wings dark fuscous.

G. mimella. Head and face tawny-brown. Labial palpi, second joint dark fuscous, with a whitish ring at its end; third joint gray, with a ring in its middle. Antennæ pale fuscous, annulated with white. Fore-wings tawny-brown, with an ochreous band near the tip, margined internally slightly with dark brown. Along the costa are a few dark-brown spots, and a few in the apical portion behind the ochreous band. Hind-wings dark brown.

Size small. Fore-wings acutely pointed or lanceolate. Hind-wings deeply emarginate beneath the tip, which is produced. Labial palpi rather short; middle joint somewhat thickened with scales, terminal rather short.

*G.? detersella.** Head and face grayish-fuscous. Labial palpi pale yellowish-white, with two fuscous patches on the middle joint, a very narrow fuscous ring at the base of terminal joint, a broad one near the tip, with the extreme apex whitish. Antennæ grayish-fuscous, annulated with

* Of this I received two specimens from Dr. Clemens; it is rather an obscure species, perhaps it comes nearest to our *G. affinis*. The exp. al. is 5 lines. H. T. S.

dark fuscous. Fore-wings grayish, very profusely dusted with dark fuscous, with a dark-fuscous spot on the disk; cilia ochreous-gray. Hind-wings pale ochreous-gray; cilia pale ochreous. Feet annulated with whitish.

I have found this genus a very difficult one. It is of great extent, and includes individuals of a variety of aspects and more or less marked modifications in the labial palpi. The oral parts in the doubtful species correspond so nearly to those of the genus, that I have concluded, after much hesitation, not to place them in separate groups, notwithstanding the produced apex of the hind-wings in some of them.

Strobisia.

Fore-wings obtuse and rounded behind. The subcostal divides into four branches, with the apical branch simple or forked. The discoidal nervure gives origin to a disco-central branch. The median is four-branched; submedian forked at the base. Hind-wings trapezoidal, not broader than fore-wings, with the hinder margin slightly emarginate beneath the tip. Subcostal bifid from the discoidal, which gives rise to a disco-central vein. Median three-branched, the two upper branches arising at a common base.

Head smooth, with appressed scales. Forehead and face rounded. Ocelli large. Eyes oval and obliquely placed. Labial palpi recurved, moderately long; second joint flattened, smooth, with appressed scales; third slender, smooth and pointed. Maxillary palpi short and distinct. Antennæ slender, simple; basal joint subclavate. Tongue scaled, nearly or quite as long as the thorax beneath.

The structure of the insects here included, closely approaches that of the genus *Gelechia*, in which I placed them in the first arrangement. I cannot believe, however, that they are members of this group, and have hence removed them.* The perfect insects are most commonly found in shaded places, on the surfaces of leaves. They are active and

* The bluntly rounded hind margin of the anterior wings is very peculiar, especially in the broader-winged species *Iridipennella*. H. T. S.

restless in their motions, and *turn in circles* on their resting-places, especially after short flights; withal they are disposed to be quarrelsome and drive away from the leaves on which they may happen to be enjoying themselves, other "little people" of the shaded wood.

Fore-wings obtusely rounded behind. Subcosto-apical branch simple. Medio-posterior vein bifid.

*S. iridipennella.** Head and thorax brown, with a greenish hue; face whitish beneath. Labial palpi dull silvery. Antennæ dark brown. Fore-wings dark brown, with a greenish-golden hue. Along the costa are three † metallic blue or violet-blue oblique streaks, scarcely reaching the middle of the wing; the first † is longest and is placed about the middle of the costa, the third † near the tip, and with three spots of the same hue beneath the second † streak, one in the fold and two in the middle of the wing. In the apical portion near the hind margin are three or four parallel similarly hued streaks, and at the base of the fold is a violet-blue spot. Hind-wings brown, along the base of the costa pale yellow.

Fore-wings obtuse, hind margin slightly oblique. Apical branch bifid.

S. emblemella.‡ Head and thorax dark brownish, with a golden hue; face whitish beneath. Labial palpi silvery-gray; third joint fuscous in front. Antennæ dark fuscous. Fore-wings dark brown, somewhat golden. The costa at the base and a basal band are dull silvery, and rather behind the middle of the costa is an oblique silvery costal streak and about the

* I received three specimens of this from Dr. Clemens; it is a very handsome insect, in colouration resembling the European *Gelechia* (*Lamprotes*) *micella*, but the silvery markings have a bluer tinge. The exp. al. is 5½—6 lines. H. T. S.

† There is also a fourth streak, nearer the base running to the fold, but it does not quite *touch* the costa: this Dr. Clemens has omitted, so that what is really the second streak is his first, the third is his second, and the fourth short subapical streak is his third. H. T. S.

‡ Of this I received three specimens from Dr. Clemens. The exp. al. is 4 lines; it is not nearly so brilliant an insect as its congener. H. T. S.

middle is a curved costal streak of the same hue. This unites with an oblique silvery streak, from the middle of the inner margin, and which becomes diffuse in the middle of the wing. Near the tip, at the beginning of the costal cilia, is a small costal silvery spot and a row of spots or short parallel bluish-silvery streaks along the hinder margin. Cilia at the tip ochreous, containing a dark-fuscous line; on the inner margin dark fuscous. Hind-wings dark brown, yellowish along the costa; cilia dark brown.

ENDROSIS? Hübner.

Hind-wings with a medio-discal branch, in addition to the disco-central; terminal branch of median bifid. Transparent patch at base, quite distinct.

*E.? Kennicottella.** Head and thorax white, with a small dark-fuscous patch on the front of tegulæ. Labial palpi white, terminal joint with a dark-fuscous ring at the base and near the tip, with the extreme apex white. Antennæ dark fuscous. Fore-wings whitish, much dusted with dark fuscous. At the base is a white spot and the adjoining portion of the costa dark fuscous; behind the middle and near the tip is a whitish spot, and opposite the latter, on the inner margin, is a whitish spot nearly joining it, both dusted with fuscous. Apical portion dark fuscous, with a few whitish spots on the margins; cilia ochreous. Hind-wings gray; cilia pale ochreous. Feet with tarsi annulated.

From Mr. Robert Kennicott of North Westfield, Ill. Two specimens.

EVAGORA.

Fore-wings rather narrow and obliquely pointed at the tip; inner margin slightly retuse beyond the middle. Discoidal cell closed by a faint, simple, oblique nervure, given off from the subcostal near the third marginal branch; without disco-

* In all probability this will prove identical with our *Endrosis fenestrella*. H. T. S.

central nervule. The subcostal runs almost straight from the base to the tip of the wing, giving off from the cell *three* marginal branches, one near the middle of the wing, and two near the end of the disk; beyond the disk it sends another branch to the costa, and before the tip becomes bifid, sending one branch above and another below the tip. The median subdivides into four branches, which are aggregated at their origins, and, except the medio-posterior, are long. The submedian is furcate at its base. Hind-wings deeply emarginate beneath the tip, which is abruptly produced, although short. The discoidal cell is closed by a slight curved nervure, and is without a disco-central nervule. The subcostal is bifid from the discal nervure, and the median gives rise to a medio-discal nervule, which curves much upward; the last branch of the median much removed from the two terminal branches, which are approximated.

Size small. Forehead rounded; face rather narrow. Ocelli none. Eyes round, moderately prominent. Antennæ rather thick, simple, and about one-half as long as the fore-wings; basal joint rather slender but short. Labial palpi cylindrical, rather short, middle joint slightly thickened toward its extremity, at least *one-half* longer than the terminal joint, which is somewhat roughened, but slender and pointed. Maxillary palpi not perceptible. Tongue scaled at the base, short, not as long as the labial palpi.

This genus shows some resemblance in structure to *Parasia*, but I think it is very distinct.

E. apicitripunctella. Head, face and thorax ochreous. Labial palpi ochreous internally, externally dark fuscous; terminal joint with a fuscous ring at the base and tip, extreme tip ochreous. Antennæ dark fuscous, indistinctly annulated with ochreous. Fore-wings brownish-ochreous, with three oblique dark streaks from the costa to the middle of the wing, bordered behind with *very pale ochreous*, the first near the base, the second about the middle of the costa, the third near the tip, with its pale-ochreous margin extended across the

wing. Beneath the *third streak* are two dark-fuscous spots, sometimes margined with pale ochreous. At the tip are three dark-fuscous dots, one nearly on the extreme apex and two others behind it. Cilia of the tip somewhat dusted with fuscous, the inner margin ochreous. Hind-wings rather dark ochreous, cilia the same.

Trichotaphe.

Fore-wings scarcely pointed, hind margin oblique, costa behind the tip deflexed. The discoidal cell is closed and rounded behind. The subcostal nervure sends four veins to the costa behind the tip, the last of which is furcate, and one to the hind margin beneath the tip from the cell. The median sends four branches to the hind margin, the last of which is furcate. Hind-wings emarginate in the middle of the costa and somewhat emarginate beneath the tip, with an intercostal cell at the base; subcostal bifid from the discal nervure, which sends a branch to the hind margin. The median is three-branched.

Head smooth, with appressed scales. Without ocelli. Eyes round and moderately prominent. Labial palpi recurved; middle joint slightly curved, rather broad, compressed laterally, squamose on the sides and hairy toward the end; terminal joint slender, smooth, pointed and not so long as the middle joint. Maxillary palpi short and distinct. Antennæ rather more than one-half as long as the fore-wings, somewhat denticulated and microscopically pubescent beneath in the male? Tongue scaled at the base, nearly as long as the thorax beneath.

Middle joint of labial palpi much flattened; hairy above and below, with diverging hairs.

T. setosella. Head, face and thorax rather dark ochreous. Labial palpi, middle joint blackish-brown externally, with the spreading hairs above and beneath at the end, ochreous; terminal joint ochreous, tipped with fuscous. Antennæ fuscous, ochreous toward the base. Fore-wings dark brown,

slightly dusted with pale ochreous. At the base of the costa is a pale ochreous irregularly triangular patch, slightly dusted with fuscous, angulated on the upper portion of the fold; the angle is margined beneath with blackish-brown, with a small patch of the same hue between the angle and base of the wing, and a large one behind it, extending from the subcostal nervure to the fold. Across the base of the nervules runs a pale-ochreous line, on each side of which the wing is nearly uniform dark brown. Hind-wings yellowish-brown.

Middle joint of labial palpi without spreading hairs.

T. juncidella. Head, face and thorax dark brown. Labial palpi ochreous-orange. Antennæ dark brown. Fore-wings dark brown, almost blackish-brown, with an ochreous-orange spot on the disk, one on the subcostal nervure nearer the base, one beneath it in the fold, and one on the end of the disk, all of the same hue. On the costa near the tip is a small ochreous-orange spot, and the cilia, which are somewhat paler than the general hue, are varied with shining ochreous. Hind-wings dull yellowish-brown.

CALLIMA.

Fore-wings rather ovate, obtusely pointed. The subcostal nervure sends four nervules to the costa, the last one furcate behind the tip, with both branches above it. From the discal proceeds a disco-central nervule, and the median subdivides into four branches. Submedian furcate at the base.

The hind-wings are much narrower and shorter than the fore-wings, emarginate in the middle of the costa, hind margin obtusely pointed and very oblique. The costal ends in the middle of the wing. The subcostal is attenuated towards the base, the discal gives rise to two nervules and the median is three-branched, the superior and central nervules arising in a short common stalk.

Head smooth, with hair-like scales. Face quite narrow. Ocelli none. Eyes round and quite prominent. Labial palpi long and recurved; the middle joint rather slender, smooth, with appressed scales, slightly flattened, longer than the third

joint, which is slender, smooth and pointed. Maxillary palpi none. Antennæ inserted on the front, basal joint smooth and subclavate, slightly denticulated beneath and microscopically pubescent (in the ♂ alone ?). Tongue scaled at the base and somewhat longer than the anterior coxæ.

This insect, I think, must approach very nearly *Œcophora* of Zeller, if it is not, indeed, a member of that genus.

C. argenticinctella. Head, face and thorax deep reddish-orange. Labial palpi, middle joint dark brown, terminal white, with a broad dark-brown ring on its middle. Antennæ silvery-white, annulated with blackish. Fore-wings yellowish-orange. Along the *basal margin* of the wing, from the fold to the basal angle, is a silvery line black-margined on both sides, and one from the basal third of the inner margin, somewhat curved and not extended to the costa, likewise silvery and black-margined on both sides; the basal portion of the wing included between these lines is deep reddish-orange. Near the apical third of the wing is a silvery costal streak, curved and tapering outwardly, slightly dark-margined on the costa behind. Opposite this on the inner margin is a semicircular silvery line, black-margined on both sides at its beginning, which terminates in a dark-brown spot, white-margined exteriorly at the commencement of the cilia, before which the line becomes grayish-silvery. The portion of the wing included within this line is deep reddish-orange, as well as the apical portion, in which along the hind margin is a row of silvery spots, each slightly dark-margined. Hind-wings fuscous. Feet annulated with white.

Nomia.*

Fore-wings rather narrowly ovate-lanceolate, discoidal cell very narrow, long and unclosed, with two independent discal nervules to the hinder margin beneath the tip. The costal nervure is short. The subcostal nearly straight, sending

* Subsequently (August, 1860, see p. 158), Dr. Clemens proposed to substitute for this name (already in use to designate a genus of bees), the name Chrysopora. H. T. S.

three nervules to the costa from the cell, the first from the middle of the wing, and its last branch bifid, with both branches above the apex. The median is two-branched, the one nearest the base bifid near its end. The submedian is furcate at its base.

Hind-wings narrower than the fore-wings, costa nearly straight, but slightly curved; apex decidedly produced, with the hind margin deeply and circularly excavated beneath it and the anal angle rounded. The discoidal cell is broad and unclosed, with a short independent discal nervule beneath the middle of the wing. Subcostal nervure simple. Median three-branched, the first delivered to the inner margin rather behind the middle, the last to the rounded anal angle.

Head smooth, with appressed scales. Forehead and face broad and rounded. Ocelli none. Eyes oval, not prominent, flattened. Labial palpi short, somewhat reflexed, smooth, rather slender and pointed; terminal joint extremely short, much slenderer than the middle. Maxillary palpi not perceptible. Antennæ about one-half as long as the fore-wings, rather thick, but tapering, roughened; basal joint rather slender and short. Tongue slender, scaled at the base, longer than the anterior coxæ.

N. lingulacella. Head, face and thorax dark fuscous. Tegulæ golden. Labial palpi pale yellowish, terminal joint fuscous. Antennæ dark fuscous. Fore-wings golden-yellow. At the base of the costa is a dark golden-brown patch, not extended beyond the fold, and margined behind and beneath with iridescent silvery. On the inner margin near the base and extended to the middle of the margin is a rather long patch of the same hue, with an iridescent silvery internal patch and touched exteriorly with the same hue. A large trapezoidal golden-brown patch on the middle of the costa is margined internally by a rather broad iridescent silvery streak, which is slightly dark-margined internally, having also an external silvery streak produced in the middle of the wing toward the apex, and beneath it, at its anterior angle, a brownish-silvery blotch, pointing to the inner margin at the

beginning of the cilia. In the apical portion of the wing is a silvery streak, dark-margined on both sides behind, pointing into the costal cilia above the apex. The costa, from the trapezoidal patch to the tip, is touched with dark brown; cilia dark brown; beneath the apex varied with silvery on the base of the cilia. Hind-wings dark brownish.

TRYPANISMA.

Fore-wings ovate-lanceolate. The discoidal cell is rather narrow and elongately oval. The subcostal nervure sends three nervules to the costa, the last from the end of the cell, together with the apical branch, which curves at its origin to send off a very short and faint discal nervure, and at its middle gives rise to a costal branch, becomes furcate behind the tip and delivers a branch above and one below the tip. The median is three-branched, the middle branch being bifid. Submedian furcate at the base. Hind-wings narrower than the fore-wings, with an intercostal cell at the base; apex produced, deeply emarginate on hind margin and anal angle rounded. The costa is slightly emarginate in the middle. The discoidal cell broad, and closed by a very faint nervure from the middle of the subcostal, which is furcate near the tip. The discal nervule arises near the median, which is three-branched, with branches rather approximated.

Size small. Head smooth, with appressed scales. Forehead and face rounded and rather broad. Ocelli none. Eyes oval, moderately prominent. Labial palpi moderate, arched; middle joint slightly thickened with scales beneath, terminal as long as the second, smooth, pointed and tapering from the middle. Maxillary palpi not perceptible. Antennæ slender and simple; about one-half as long as the fore-wings; basal joint subclavate. Tongue scarcely so long as the labial palpi.

T. prudens. Head pale yellowish-white, dusted with fuscous. Face yellowish-white. Labial palpi pale yellowish-white, with two dark-brown spots on the second joint and two rings on the terminal of the same hue, one at the base

and one near the apex. Thorax yellowish, dusted with fuscous. Antennæ fuscous, slightly annulated with yellowish. Fore-wings fuscous, tinted with yellowish, with a small ochreous-yellow patch on base of costa, one of the same hue on the middle of inner margin, extended to the middle of the wing, and a band of the same hue near the tip, much angulated or nearly interrupted in the middle of the wing. Hind-wings fuscous.

The generic characters of this insect approach those of *Evagora*. The larva lives within a silken web woven on the under surface of the leaves of chestnut oak. It feeds on the cuticles and parenchyma of both sides of the leaf, gaining the upper side by round holes eaten through its substance, and just large enough to admit the body; of these there were three at various points of the eaten surface. If alarmed the larva immediately retreats through the opening last made to the web on the under surface. The pupa is robust, almost ovoid, and is contained in a slight cocoon woven on the leaf on which the larvæ feed. It was taken July 22nd, became a pupa on the 27th, and an imago on August 8th.

Butalis, Treitschke.

B. fuscicomella. Head, face, labial palpi and thorax yellowish-fuscous; antennæ purplish-fuscous. Fore-wings purplish-fuscous, tinted somewhat with yellowish; cilia purplish-fuscous. Hind-wings dark fuscous.

Taken on wing in June. The egg is ellipsoidal; dirty white; investing membrane thin and covered with punctures, variolate.

Fore-wings with three subcosto-marginal branches, the apical simple: apex pointed.

*B. flavifrontella.** Head and face pale brownish-ochreous. Labial palpi dark fuscous. Thorax and antennæ purplish-

* Of this I received one specimen from Dr. Clemens; it is perhaps identical with *B. basilaris*, Zeller (Linn. Ent. x. 230). The exp. al. is 5½ lines. H. T. S.

fuscous. Fore-wings purplish-fuscous, with a yellow basal streak from the base to the middle of the wing, sometimes almost wanting, and the tip of the wing of the same hue. Hind-wings dark fuscous.

Fore-wings with three nervules beneath the apical.

*B. matutella.** Head, face, thorax and antennæ dark brownish, with a purple hue. Fore-wings reddish-fuscous, with a brassy lustre; a pale greenish-white spot rather obliquely placed near the middle of the wing, and one of the same hue on the inner margin, near the apex. Hind-wings dark fuscous, cilia the same.

ANARSIA? Zeller.

Fore-wings ovate-lanceolate; with an *opaque space* on the costa, towards the end of the costal nervure, and the first subcosto-marginal branch. Discoidal cell rather narrow, closed by a short nervure. The subcostal sends four branches to the costa, the first from a point rather behind the middle of the wing, much separated from the second, and the last *furcate* on the costa before the tip, and a simple branch beneath the latter to the inner margin just beneath the tip of the wing. The median subdivides into four branches, rather approximated at their origins, the medio-posterior branch being nearly opposite to the second marginal. Subcostal† furcate at the base. Hind-wings trapezoidal, costa retuse, slightly emarginate beneath the tip, hind margin obliquely rounded; broader than the fore-wings. Subcostal nervure rather attenuated toward the base, with a faintly formed intercostal cell, furcate. Discoidal cell broad, closed, with a nervule given off to the hind margin. Median three-branched, medio-posterior branch distant from the others.

* Of this I received six specimens from Dr. Clemens; it is possible that it may be the *B. impositella*, Zeller (Linn. Ent. x. 241). The exp. al. is 5 lines. H. T. S.

† *Submedian* is probably here meant, *not subcostal*. H. T. S.

Head smooth, covered thickly with decumbent scales. Forehead broad, almost spherical; face rather narrow beneath. Ocelli none. Eyes rounded, moderately prominent. Labial palpi, *second joint thick, with a very abundant tuft of hairs beneath prolonged in front;* third joint *smooth, slender and pointed,* as long as the second. Maxillary palpi *short and distinct.* Antennæ simple, scarcely more than one-half so long as the anterior wings, slightly denticulated, basal joint smooth. Tongue scaled at the base, about as long as the labial palpi.

I have three specimens of the insect belonging to this genus, but none of them show the peculiar structure of the palpi of the European male.* Whether mine are all females, or whether the individuals are generically distinct from the European, as the detail of some parts of their structure seems to indicate, must be left for future determination.

Cf type p. 66-67 *A. ? pruniella.** Head and face pale gray; thorax dark gray. Labial palpi dark fuscous externally, and pale gray at the end; terminal joint gray, dusted with dark fuscous. Antennæ grayish, annulated with dark brown. Fore-wings gray, dusted with blackish-brown, with a few blackish-brown spots along the costa, the largest in the middle, and short blackish-brown streaks on the median nervure, subcostal, in the fold, and one or two at the tip of the wing; cilia fuscous-gray. Hind-wings fuscous-gray; cilia gray, tinted with yellowish.

The larva was taken June 16th, full grown and about to transform on the limbs of the plum. Its head is black, body uniform reddish-brown, with indistinct papulæ, each giving rise to a hair, and with pale-brown patches on the sides of the 3rd and 4th segments; shield and terminal prolegs black. One specimen had secreted itself under a turned-up portion of the old bark of the trunk. The cocoon is exceedingly slight, and the tail of the pupa is attached to a little button

* See *ante*, p. 36. H. T. S.

of silk. The pupa is ovate, abdomen short and conical, smooth; colour dark reddish-brown. I do not know on what part of the tree the larva feeds.

Stilbosis.

Fore-wings narrow and pointed. Discoidal cell open, elongated and very narrow. Subcostal nervure, with three nervules to the costa from the cell, and an apical branch which sends *a nervule to the costa from its middle, and is bifid at the tip of the wing;* the apical branch is nearly obsolete from the third to the fourth marginal branch. Beneath the apical is a discal nervule, which is obsolete posteriorly from its middle. The median is three-branched; the submedian simple. Hind-wings setaceous; the discoidal cell is open and moderately broad toward the base of the wing. The subcostal is obsolete toward the base and bifid at the tip of the wing; *a discal nervule beneath it is obsolete posteriorly from its middle.* The median subdivides into three separate branches.

Head and face perfectly smooth. Ocelli none. Eyes small, oval and visible in front. Labial palpi moderate, somewhat curved, slender, smooth and pointed; terminal joint as long and as thick as the middle, and very acute at its apex. Antennæ rather thick, simple, somewhat roughened, rather short; basal joint smooth and subclavate. Tongue short. This genus is nearly related to *Cosmopteryx* of Hübner,* but the labial palpi are much less developed, and the tongue much shorter.

S. tesquella.† Head and face grayish-silvery, having a greenish splendent lustre. Labial palpi ochreous. Antennæ dark fuscous.‡ Fore-wings fuscous-golden, tinted along the

* It also shows affinities with *Stathmopoda,* but differs widely from both in the shorter and thicker antennæ. H. T. S.

† I received three specimens of this from Dr. Clemens. The exp. al. is 4½ lines. H. T. S.

‡ Dr. Clemens should have added "*with the tip white.*" H. T. S.

base of the costa with reddish-violet; with *three patches of raised scales*, one in the fold near the base, one behind the middle of the wing, and one near the tip on the inner margin, the latter two are large and extended nearly to the costa. In certain lights these raised patches are golden *internally*, while the spaces of the wing between them become dark fuscous, and with the light striking the wing from the tip the patches are dark ochreous, and the last is extended obliquely into the costa as a streak of the same hue. The tip of the wing is reddish-violet, in certain lights dark fuscous. The cilia are very long and are extended along the hind margin beyond the middle of the wing; fuscous, tinged with reddish. Hind-wings dark fuscous, cilia the same.

Laverna, Curtis.

Fore-wings pointed, oblique along the hinder margin, with five veins beneath the furcate apical vein. Discoidal cell narrow. Submedian *furcate at each end;* basal fork long, the apical fork shorter. Hind-wings rather retuse on the costa before the tip; hind margin rounded or cimetar-shaped from base to apex. The subcostal is obsolete toward the base, simple and runs into the costa before the tip. Discoidal cell closed, with a discal vein furcate at the tip. Median three-branched, the last two arising on a common base.

Head smooth; backhead or vertex elongated. Forehead obtuse, advanced; face retreating. Eyes oval, visible in front. Labial palpi moderately long, curved, smooth but rather loosely scaled; second joint flattened toward its end, subclavate; the third short, smooth and pointed. Antennæ rather more than one-half as long as the fore-wings, simple, setaceous, basal joint subclavate. Tongue sparingly scaled, extremely short, not one-half as long as the labial palpi.

L. luciferella. Head and face silvery, tinged with yellowish. Backhead dark fuscous. Labial palpi silvery; middle joint

dark fuscous from the base to the middle, the terminal joint with a minute fuscous dot at its base. Antennæ dark fuscous. Fore-wings dark reddish-fuscous, with a large, rather faint bluish-silvery patch at the base, one on the middle of the costa, and a curved band near the tip of the wing, of the same hue. On the fold beneath the costal patch is a patch of raised scales, and another on the inner margin joining the band behind. Exterior to the band the wing is touched with ochreous, containing in the middle a short dark-fuscous streak, sometimes a pale yellowish-white streak margined with dark fuscous, and on the costa, just behind it, is a short pale yellowish-white streak, margined exteriorly with dark fuscous. Apical portion of the wing is dark fuscous; cilia of inner margin fuscous. Hind-wings fuscous, cilia the same.

Fore-wings slenderly and shortly caudate at the tip. Apical vein with a long fork, with an independent discal nervure beneath it. Median four-branched. Submedian with a long basal fork, no apical fork, but with the end of the fold thickened. Labial palpi recurved, thickened at the end of second joint with loose scales; the third rather long, smooth and pointed. Tongue nearly as long as the anterior coxæ.

L. Eloisella. Head, face and thorax silvery-white, the latter spotted with blackish. Labial palpi white, with a dark-brown spot on the middle of the second joint, and two dark-brown rings on the third, one at the base and one at the tip. Antennæ tawny-yellow, white at the base. Fore-wings silvery-white, with a small tuft of tawny scales at the basal third of the fold, and a larger patch of the same hue on the inner margin at the end of and above the fold. Between the tufts is an oblique dark-brownish costal streak, nearly joined at an angle by another of the same hue in the middle of the wing and exterior to the first tuft; the fold is tinted with golden-yellow. Exterior to the second tuft is a blackish-brown streak, which becomes diffuse behind and above, while

the apical portion of the costa to the slender apex of the wing is golden-yellow. At the base, beneath the fold, is a blackish-brown spot, and another of the same hue beneath the fold, equidistant from the first and the first tuft of scales, and on the costa midway between these latter is a rather faint dark-brownish spot. Cilia yellowish-gray. Hind-wings tawny-grayish, cilia ochreous.

Chrysocorys, Curtis.

*C. Erythriella.** Head, face and thorax fuscous, with a greenish-brassy hue. Labial palpi ochreous, terminal joint fuscous. Antennæ bronzy-yellowish fuscous. Fore-wings reddish-fuscous, with a greenish-brassy hue; cilia fuscous. Hind-wings reddish-fuscous, cilia the same.

Specimens of this insect reared by myself were much smaller than those taken on the wing, had less of the brassy hue and were nearly uniform *grayish-fuscous*, but I have no doubt it is the same insect.

The larva feeds on the fruit racemes of sumach. It tapers anteriorly and posteriorly, incisures deep, segments elevated in the middle, with a single row of transversely arranged epidermic joints on each ring, each one giving rise to one or two rather stiff hairs; abdominal legs very slender and short, terminal placed posteriorly. Head with a few hairs, ellipsoidal, pointed, rather small, and pale brown. The body is uniform dark green. "Frass" scarlet.

The cocoon was woven on the outside of the raceme. It was ovoid and appeared to consist of coarse silk and but a single thread, being woven so as to leave large meshes, enabling one to see the pupa through it distinctly. At maturity the pupa case is thrust forth. The pupa is pale green, with the head-case distinctly separated from the case of the thorax. The length of the larva is about two lines, of the pupa about one and a half.

* Of this I received two specimens from Dr. Clemens; it is closely allied to our *C. festaliella*. The exp. al. is 4½—5 lines. H. T. S.

The larva may be taken in July; the imago appears early in August, and may be taken on the wing at this time in the neighbourhood of the food plant of the larva.

ELACHISTA, Treitschke.

I would beg here to call the student's attention to the fact, that the genus described in Paper No. 3, January, 1860, under the name *Cosmiotes*,* is the same as the present one. I much regret the existence of this error; it is not, however, necessary to state how I came to be misled.

Median vein of hind-wings two-branched. Apical vein of fore-wings with a branch from its middle to the costa, bifid at the tip; median vein two-branched.

E. præmaturella. Head, face and labial palpi grayish-fuscous. Antennæ rather dark fuscous. Fore-wings fuscous, with a purplish hue. Rather behind the middle of the wing is a white band, silvery-hued, and near the tip a costal and opposite dorsal spot of the same hue. Extreme apex of the wing white, with a row of dark-brown atoms in the cilia, which are fuscous. Hind-wings bluish-gray, cilia fuscous, with a reddish hue.

The imago may be taken on the wing early in April.

BRENTHIA.

Fore-wings almost *cuneiform*, rounded behind. The subcostal nervure sends a vein to the costa from the middle of the cell, and subdivides into two branches at the point of junction with the discoidal nervure; arising from this are *five veins* to the hinder margin, and the median nervure subdivides into two branches at its tip. The subcostal† is furcate at the base. The hind-wings are broad, irregularly

* See *ante*, p. 97. H. T. S.

† "*Submedian*" is probably here intended. H. T. S.

oval. The subcostal is simple. The discoidal does not join it, gives rise to *three veins* to the hind margin, and is deflected towards the base. The median is two-branched, the upper one being bifid about its middle.

Head smooth. Forehead and face rounded. Ocelli large. Eyes oval and rather prominent. Labial palpi moderately long, rather slender, pointed and somewhat squamose; the terminal joint shorter than the second. Antennæ slender, simple in the ♀, rather densely ciliated in the ♂. Tongue slightly scaled and very short.

The insect belonging to this genus, which is nearly allied to *Glyphipteryx* of Hübner,* has the curious habit of strutting about broad leaves in shaded places, with its fore-wings somewhat spread and the hind-wings turned forward at right angles to the costa of the fore-wings, so as to display the surface of the under pair. It is easily recognized by this characteristic alone.

3. *B. pavonacella.*† Head and thorax fuscous; face whitish beneath. Labial palpi white, with three fuscous rings, one at the end of the second joint, one at the base of the terminal and one near its tip. Antennæ fuscous, annulated with white. Fore-wings fuscous, mottled with whitish, especially on the middle of the wing, with a fuscous spot on the middle of the disk, ringed with whitish. Near the hinder margin is a black band, not extended to the costa nor the inner margin, with two sharp indentations of the general hue internally, and containing on its middle a streak of brilliant scarlet-blue metallic scales. Along the costa are one or two faint spots of the same hue. Hind-wings fuscous, whitish at the base and along the costa, with a short white line near the hind margin, above the inner angle of the wing, and a rather faint scarlet-blue metallic hued band on the hind margin, from near

* Probably a *Simaëthis*, see *ante*, pp. 38, 41. H. T. S.

† Of this I received four specimens from Dr. Clemens. The exp. al. is 4½ lines. H. T. S.

the tip to beyond the middle. The under surface of both wings shows a metallic hued subterminal band.

Imago on the wing in July and August.

PIGRITIA.

Fore-wings narrow, elongated, pointed and very slightly retuse on the costa before the tip. The subcostal sends to the costa, beyond the apical third of the wing, a long, thick vein, which arises behind the middle, and subdivides into three branches at its tip, the apical being forked, with one of its branches delivered to the tip and the other to the costa before it. The discoidal cell is much elongated and narrow, and sends to the hinder margin a disco-central branch. The median is three-branched at its tip, all of which are short, and the two upper veins arise on a common stalk. Submedian is forked at the base, with the lower branch nearly obsolete. Hind-wings narrowly lanceolate, broad at base, with interior basal angle rounded. The subcostal vein is simple and extended to the tip. Discoidal cell closed by a very faint nervure, giving rise to a *simple nervule*. Median nervure is three-branched, the last two branches from a common base.

Head smooth, with decumbent scales, slightly retracted. Forehead broad and rounded; face with the scales spreading out at the base of the tongue, so as to make it nearly equally broad. Eyes oval, vertically placed. Ocelli small. Labial palpi very short, smooth; first and second joints rather thick; terminal joint pointed, slender, and as long as the second. No maxillary palpi. Antennæ setaceous, simple in the ♀, microscopically pubescent in the ♂, rather more than one-half as long as the fore-wings; basal joint flattened and expanded into a small eye-cap, with cilia in front. Tongue scaled, rather longer than the thorax beneath.

I have but one male, which is *without labial palpi*. With the aid of good lenses, I cannot make out whether they have

been broken off, or whether they are naturally obsolete. Otherwise the head is in most perfect condition.

The genera *Zelleria* and *Ocnerostoma* are congeneric with this in the neuration of the wings, especially the hinder pair in the latter genus.

*P. laticapitella.** Head, face and thorax shining tawny-fuscous. Labial palpi dark fuscous. Antennæ fuscous, basal joint tawny-fuscous. Fore-wings dark fuscous, with a rufous tinge, sprinkled with white, especially toward the tip, with an indistinct whitish band behind the middle of the wing; cilia pale rufo-fuscous. Hind-wings grayish-fuscous; cilia the same.

PARASIA? Duponchel.

Fore-wings lanceolate. The subcostal nervure sends three veins to the costa, the first from the middle of the cell, and an apical branch which delivers from its middle a branch to the costa, and is forked before the tip, with one of the branches above and the other beneath it. The discoidal cell is closed, but gives rise to no nervule. The median fan-branched, more separated than in *Evagora* and all the branches long. Submedian is forked at the base. Hind-wings with the apex produced. The submedian is forked *beyond the discal nervure*, which gives rise to a disco-central branch. The median is three-branched.

Head smooth, with loose decumbent scales. Forehead advanced, globose; face retreating. *Ocelli small.* Eyes oval, vertically placed, but little visible from the front. Labial palpi rather short, recurved, smooth, with appressed scales; second joint thick, subclavate; third joint short, very acuminate. Maxillary palpi short, distinct. Antennæ simple, setaceous, one-third less long than the fore-wings. Tongue clothed with scales, scarcely as long as the anterior coxæ.

* Of this I received two specimens from Dr. Clemens; it is an obscure-looking insect of doubtful location, reminding one somewhat of *Blastobasis phycidella*. The exp. al. is 5 lines. H. T. S.

This insect and *Evagora apicitripunctella** certainly approach each other closely in structure: nevertheless, they are very different in appearance. The hind-wings differ from those of *Parasia* in the produced apex being straight, and slightly in neuration.

P.? subsimella. Head, face and thorax ochreous-fuscous. Labial palpi, second joint dark brownish, ringed with whitish at its tip; third joint white, terminal half black. Antennæ dark fuscous, basal joint striped with yellowish in front. Fore-wings dark ochreous-fuscous; along the costa from its middle, and toward the tip, brown, and in the latter part much sprinkled with whitish. On the middle of the costa is a short, yellowish-white streak, and in the apical third of the wing is an oblique line of the same hue, meeting in the middle of the wing another of the same hue from the inner margin. At and beneath the tip is a blackish-brown spot, and in the cilia a dark-fuscous line. Hind-wings dark ochreous, cilia the same.

Depressaria, Haworth.

D. Lecontella. Head and face ochreous. Labial palpi ochreous; second joint varied externally with fuscous; third joint with a slight fuscous ring at the base, and one near the tip. Antennæ fuscous. Thorax ochreous, with two blackish-brown dots before. Fore-wings dark ochreous, with dispersed blackish-brown dots throughout the wing, two of which, about the middle of the median nervure, are more conspicuous than the others; cilia rather pale ochreous. Hind-wings pale grayish-ochreous, cilia the same.

This is the only true *Depressaria* I have found thus far; but we have other nearly allied species, which differ from it in the structure of the labial palpi. In this respect they resemble somewhat *Gelechia rufescens* of Europe, but differ from the genus to which it belongs in several particulars. I

* See *ante*, p. 120. H. T. S.

think they must form a group intermediate between *Depressaria* and *Gelechia.**

I have now nearly worked up my collection of *Tineina*, and would beg those who feel interested in the continuation of these studies, to aid me in extending my knowledge of species, by contributing collections from their various neighbourhoods.

* Probably of the genus *Cryptolechia*, so extensively represented out of Europe. H. T. S.

[Extracted from the Proceedings of the Academy of Natural Sciences of Philadelphia, June, 1860, pp. 203—221.]

CONTRIBUTIONS TO AMERICAN LEPIDOPTEROLOGY.—No. 5.

BY BRACKENRIDGE CLEMENS, M.D.

[THE first five pages are devoted to descriptions of CRAMBITES and PHYCITES, viz.,—

Crambus agitatellus,
C. laqueatellus,
C. involutellus,
C. camurellus,
C. luteolellus,
C. caliginosellus,
C. mutabilis,
C. vulgivagellus,
C. albellus,
C. elegans,
C. Girardellus,
C. auratellus,
Chilo longirostrallus,
C. melinellus,
C. aquilellus,
Nephopteryx undulatella,
N.? ulmi-arrosorella,
Pempelia? virgatella,
P.? subcæsiella,
Ephestia ostrinella,
E. Zeæ,
*Lanthaphe platanella,**
L. asperatella.]

TINEINA.

LITHOCOLLETIS. (See Paper No. 2.)†

L. Fitchella. Argyromiges quercifoliella, Fitch, Report V., Section 327. Head, face and thorax silvery-white. Labial palpi tipped with pale ochreous. Antennæ pale saffron; basal joint silvery-white. Fore-wings pale reddish-saffron, with a slight brassy hue. Along the costa are *five*

* Of this I received two specimens from Dr. Clemens; see *ante*, p. 38. H. T. S.
† See *ante*, p. 62. H. T. S.

silvery-white costal streaks, all black-margined internally except the first, which is very oblique and continued along the costa to the base of the wing. All the costal streaks are short, except the first. On the inner margin are *two conspicuous silvery dorsal streaks,* dark-margined internally, *the first very large,* and placed near the middle of the inner margin, the second opposite the third costal streak. At the tip is a small, round black spot, placed above the middle of the wing; cilia silvery-gray, tinted with saffron. Hind-wings grayish-fuscous; cilia paler.

The specific name used by Dr. Fitch being already in use to designate a European species of this genus, it was necessary to change it. I feel pleasure, therefore, in dedicating it to the industrious observer who first described it, and who is adding so much to our knowledge of entomological Natural History.

L. tubiferella. Head silvery-white. Antennæ fuscous, slightly annulated with white; basal joint pale saffron. Fore-wings pale saffron, with two silvery-white moderately broad bands, black-margined externally, one near the base and the other on the middle of the wing, and both somewhat oblique; cilia of the general hue. Hind-wings dark grayish, cilia the same.

The larva belongs to the second larval group of this genus, but the body is much more contracted than that of any other larva I have seen. Its form is almost that of a flattened ovoid, the rings separated by deep incisions, and each forming in the sides a projecting mammilla.

The larva mines the upper surface of the leaves of oaks in September, and doubtless also in the summer months. The mine is a linear tract, sometimes curved or wavy, gradually increasing in breadth from the beginning to the end, or as the larva increases in length, with the "frass" deposited on each side of the tract and marking its outlines by two black lines. The position of the larva within the mine is likewise a peculiar one, as it is always placed transversely to its

course, and hence the deposition of the "frass" on the sides, and the gradual increase in breadth as the larva grows in length. Its head is blackish-brown; the body pale greenish, with pale-brown dorsal maculæ, darker on their edges. It undergoes transformation in the end of the mine, preparing a circular cell or slightly silk-lined cavity, and leaves the last larval cast outside of it. The fall brood of larvæ become imagos about the middle of May.

*L. cratægella.** This insect is found on the apple and wild cherry (*P. serotina*), without undergoing any variation which I can detect. I thought beyond doubt, that that in the leaf of wild cherry must be a distinct species, for the larva has a habit unusual to larvæ of this group, and which I have not noticed in those on the thorn and apple, although, doubtless, they correspond. The habit I refer to, in wild cherry miners, *consists in deserting an old mine to form a new one*,—reminding one strongly of the early habits of the *Ornix* larvæ. The larva enters along the midrib to form a new mine, which I have found in various stages of advancement, besides the old and tenantless mine in another portion of the leaf.

Tischeria. (See Paper No. 2.)†

T. malifoliella. Head and antennæ shining dark brown; face ochreous. Fore-wings uniform, shining dark brown with a purplish tinge, slightly dusted with pale ochreous; cilia of the general hue. Hind-wings dark gray; cilia with a rufous tinge.

The larva mines the upper surface of the apple leaf. The mine is flat, at least until the larva enters the pupa state, and begins as a slender *white line*, dilating as it increases, and is ultimately formed into an irregular brownish-coloured patch, which is sometimes extended over the beginning. This is then

* See *ante*, p. 76. H. T. S.

† See *ante*, p. 79. H. T. S.

shown on the separated epidermis as a white line or streak. The head of the larva is brown; the body uniform pale green; first segment brownish, with a short vascular greenish streak. When the pupation begins the leaf is thrown into a fold, which is carpeted with silk, and the pupa lies within it. This state begins about the latter part of September, and the imago appears early in May.

Antispila. (See Paper No. 3.)*

A. Isabella. Head *golden.* Antennæ purplish-brown. Fore-wings *purplish-brown, without violet and greenish reflections,* with a pale-golden band near the base, inclined toward the base, not constricted on the fold, but broadest on the inner margin. Near the tip of the wing is a small pale-golden costal spot, and one of the same hue nearly opposite on the inner margin. The hind-wings have a *greenish reflection;* in *Nyssæfoliella* they are rather deep purple.

The larva mines the leaf of the Isabella grape in September. Its head is brown; the body yellowish-white, with a few black dorsal spots on a dark-green ground, on the middle segments and beneath a spot on the fourth and fifth segments; first segment dark green. It cuts out a very large, nearly round disk, during the latter part of September, and appears as an imago in the latter part of May.

A. viticordifoliella. The larva mines the leaves of wild grapes. Its head is brown; the body yellowish-green, without dorsal or ventral spots; the first ring brown. It may be taken in August, and in the beginning of September it cuts out a small oval disk and enters the pupa state. I have not succeeded in breeding the imago, but have no doubt it is specifically distinct from any heretofore described.

* See *ante*, p. 102. H. T. S.

ASPIDISCA.

(See Proceedings, January, 1860, p. 11.)*

The diagnosis of this genus was made from two specimens of *A. splendoriferella.* In insects so extremely small and fragile, even when relaxed by moisture, it is no simple task to make a correct diagnosis from a single examination. The reader will therefore please correct in the January number of the Proceedings as follows:† *Labial palpi extremely short and slender, much separated. Tongue naked and scarcely as long as the anterior coxæ.*

A. lucifluella. Head silvery. Antennæ rather dark fuscous. Fore-wings silvery from the base to the middle, and thence to the tip dark fuscous varied with golden. Near the tip are *three short, costal silvery streaks* adjacent to each other; the first is longer than the others, with converging dark margins, and a *golden patch* on its internal side; the second with straight dark margins, and a golden patch beneath and adjoining it; the third is unmargined, except by the external margin of the second streak, which separates them. Opposite the first costal streak is a dorsal, tapering streak of the same hue, and placed in the dark-fuscous portion of the wing. From the second golden spot to the middle of the hinder margin is an oblique silvery streak, sometimes separated into two spots. At the extreme apex is a deep black triangular spot; the cilia grayish, tinged with pale brownish.

The larva may be found in September and October, mining the leaves of hickories. The head, first and second segments are brownish, with a reddish tinge; body brownish-green, with a dark green vascular line and three blackish dorsal spots on the middle segments. Early in October the larva cuts out an oval disk and enters the pupa state, to appear as an imago early in June. The perfect insect is larger than *Splendoriferella.*

* See *ante*, p. 104. H. T. S.

† See *ante*, pp. 36 and 105. H. T. S.

PARECTOPA.

The fore-wings are lanceolate. The disk is acutely closed behind, at the apical third of the wing and narrow. *No costal nervure.* The subcostal sends off quite near the base of the wing a long marginal branch, and, near its end, two other branches to the costa. From the acute apex of the disk arises the apical branch, which near its origin sends a branch to the costa, and about its middle becomes bifid, sending one branch to the costa near the tip, and the other to the inner margin beneath it. The median is *three-branched*, the posterior vein arising somewhat interiorly to the costal origin of the second marginal, and is most distinct on the inner margin, being faintly indicated from its middle to its origin.

Hind-wings very narrow, almost setiform. The disk unclosed. The costal nervure is well indicated and long, reaching almost to the tip of the wing. The subcostal is furcate beyond the middle of the wing, and is attenuated toward the base almost from its bifurcation; it runs close to the costal trunk. The median nervure is furcate within the middle of the wing, on the inner margin.

Head with long, loose scales above, forming a slight tuft between the antennæ. Forehead rounded. Face narrow and short, somewhat retreating and smooth. No ocelli. Eyes small, round, salient and naked. Labial palpi moderately long, slender, smooth, pointed and drooping (in the living insect most probably ascending); second joint slightly thickened at its end. Maxillary palpi not perceptible. Antennæ inserted on the front; filiform and simple; basal joint scarcely thicker than the stalk and short; nearly as long as the fore-wings. Tongue naked, slender, nearly as long as the thorax beneath.

P. Lespedezæfoliella. Head and face white. Labial palpi, second joint dark fuscous, the third white. Antennæ dark grayish-fuscous. Thorax blackish-brown. Fore-wings

blackish-brown, with three silvery-white spots along the inner margin; one almost at the base of the wing, one at the apical third, and the other intermediate between them. On the costa are two silvery-white spots, the first a little exterior to the second dorsal; the second costal opposite the third dorsal. Along the hinder margin is a black hinder-marginal line, or two decided converging black streaks, one from the costa, and the other from the inner margin, meeting at the tip where there is a small silvery-white spot. The cilia along the *hinder margin are silvery-white, tipped with blackish*, and along the inner margin dark gray. Hind-wings dark fuscous, cilia the same.

The larva mines the leaves of bush-clover (*Lespedeza violacea*), early in September. It makes a whitish blotch mine, with a number of narrow lateral mines, or rather wide galleries running out from it on the upper surface of the leaf. The blotch is chiefly in the middle of the leaf, the larva mining along the mid-rib in the first instance, and when disturbed it conceals itself by retreating to the mid-rib, and applies itself along the course of it. Hence tenanted mines may easily be mistaken for deserted ones. The mine never contains "frass," and the larva seems to leave one capriciously, whilst it is yet small in extent, to form a new one; this it does by penetrating the under cuticle of the leaf. In the course of larval life many new mines are formed and the insect is a troublesome one to breed. The larva is cylindrical, slightly tapering from the first segment, and the body bright, concolorous green. It deserts its food plant about the middle of September to form its cocoonet; this is woven upon some substance on the ground, in the vivarium, in a pucker on a leaf, or under a turned-down portion of the edge, and is white. It appears as an imago early in May.

I have no good description of this larva in my notes, but have of another having precisely similar habits, and in appearance very like it. It mines a species of *Desmodium*, plants nearly related to *Lespedeza*, and is probably the same insect, or at least of the same genus, as the above. The body of this

larva tapers posteriorly; it is submoniliform and slightly flattened, with segments roundly mammillated on the sides. The feet are three, the abdominal three and the terminal one pair.

The head is pale brown; the body bright green, tinged with yellowish. The larvæ desert their mines to form new ones; hence they are never extensive, sometimes blotches, and again irregular galleries along the mid-rib, with lateral branches. The "frass" is voided at the entrance opening beneath. I was not successful in breeding the larvæ on *Desmodium*.

Bucculatrix, Zeller.

(See Paper No. 3, Proceedings, January, 1860. The authority there given is a mistake.*)

B. pomifoliella. Head and face very pale ochreous, with the tuft tipped with brownish. Antennæ pale ochreous, dotted above with dark fuscous. Fore-wings whitish, tinged with pale yellowish, freely dusted with brown. On the middle of the inner margin is a large dark-brown oval patch, forming with its opposite, when the wings are closed, a conspicuous, nearly round dorsal patch; a streak of the same hue, from the costa opposite it, running to the inner angle of the wing and tapering from the costa, where it is broadest. At the tip is a round dark-brown apical spot, and in the cilia a dark-brown hinder-marginal line. Hind-wings pale brownish-ochreous, cilia the same.

The larva feeds externally on the leaf of apple, at least at the time it was taken, in the latter part of September. It is cylindrical and submoniliform; tapers anteriorly and posteriorly; with punctiform points and isolated hairs, first segment with rather abundant dorsal hairs; thoracic feet three, abdominal four and very short, terminal one pair. Head small, ellipsoidal, brown; body dark yellowish-green, tinged with reddish anteriorly, hairs blackish and short.

* See *ante*, p. 108. H. T. S.

Early in October the larva enters the pupa state, weaving an elongated, dirty white, ribbed cocoon, and appears as an imago during the latter part of the following April or early in May.

B. agnella. Head and face sordid white, the latter touched with fuscous. Antennæ dark fuscous. Fore-wings whitish, washed with pale luteous-brown, which prevails especially towards the tip and along the fold. About the middle of the inner margin, on the fold, is a small dark-fuscous mark, consisting of a few scales. *The costa is dark fuscous from the base,* and about the middle of the wing gives off a short oblique streak of the same hue, and another near the apical third, which is fuscous near the costa and pale luteous-brown beyond it, and margined exteriorly with white, especially on the costa. The long scales in the cilia are tipped with dark brown. Hind-wings brownish; cilia brownish, with a rufous tinge.

Taken on the wing about the middle of May.

Machimia.

Fore-wings with the hind margin obliquely pointed. The subcostal nervure gives off a marginal branch near the basal third, and at the end of the disk subdivides into four nervules, of which the apical is furcate near the tip. The median is four-branched, the medio-posterior remote from the penultimate. The submedian is furcate at the base. In the disk is a long, faintly indicated, secondary cell. The neuration of the hind-wings like that of *Depressaria.* The discal nervure is oblique. The interior basal angle rounded, and the margin slightly excised behind it.

Head and forehead between the antennæ *shaggy.* Face rather smooth, depressed and retreating. No ocelli. Eyes small, oval and salient. Labial palpi rather long, remote from the face, slender, curved and ascending; *second joint roughened with scales;* the third smooth, aciculate, and about

one-third less long than the second. Maxillary palpi very short. Antennæ about one-half as long as the fore-wings, simple and filiform; basal joint short. Tongue scaled, about as long as the anterior coxæ.

M. tentoriferella. Labial palpi pale yellowish; basal half of the second joint blackish or dark fuscous. Fore-wings reddish-ochreous, with dispersed dark-fuscous atoms. The extreme base of the costa is blackish, from a small black spot on its edge; with three blackish-brown spots arranged in a triangle in the middle of the wing, one about the middle of the disk, another on its end, and one in the fold beneath them; cilia rather long and russet-coloured. Hind-wings rufo-fuscous, along the discal portion of costa pale ochreous.

The larva tapers posteriorly from the head; terminal legs short, placed posteriorly, projecting beyond the shield; abdominal legs short; with papiliform points in squares, each bearing a hair; body cylindric and submoniliform. The head is large, carried horizontally; somewhat flattened above but rounded; cervical shield doubtfully indicated, its colour dark green. Body dark green, at first uniform, but after the last moult a double yellowish-green dorsal line is added.

It may be found during the latter part of July on the leaves of wild cherry, oaks and hickories. On the underside of the leaf it throws a closely woven sheet or web from the mid-rib to the side of the leaf, and draws it into a shallow fold. This sheet or tent is not much longer than the larva itself, open at both ends, transparent, shining and vitreous. Beneath this it rests during the day, and in the night leaves it to feed on the edges of the leaf, retreating to its cover if alarmed. To this it clings most tenaciously if disturbed, thrusting its head from beneath it, shaking it from side to side; or if disturbed in front, retreats, without leaving it, and defends itself stoutly with its mandibles. Its length is about half an inch. When it leaves a leaf to form a new tent on another, it always devours the silk of the one it deserts.

During the latter part of August or first part of September

it enters the pupa state and forms its cocoon, by turning down a portion of a leaf, carpeting it with silk and binding its edges closely. The opening left at the end, corresponding to the tail of the pupa, is closed densely, and the other with loose silken threads. The pupa-case is very dark reddish-brown, and it remains *in situ* when the imago escapes. The antennæ-cases as long as the wing-cases; abdomen rather short and blunt; cylindrico-conical. The imago appears during the latter part of September.

Psilocorsis.

The neuration of the wings differs in scarcely any respect from the foregoing genus, except that the medio-posterior vein *is not remote from the penultimate.* The posterior veins of the median are very much curved. The structure of the fore-wings in both these groups is much like that in the *Tortrices.*

Head smooth. Face rounded. Ocelli none. Eyes large, round and salient. Labial palpi long, remote from the face, recurved, rather slender; second joint rather flattened, *smooth, with appressed scales;* third smooth, slender and pointed, nearly as long as the second joint. Maxillary palpi short, distinct. Antennæ about one-half as long as the fore-wings, simple and filiform; basal joint rather long and subclavate. Tongue one-half as long as the thorax beneath, scaled.

P. quercicella. Head and thorax dark yellowish-brown. Labial palpi, second joint ochreous, with a black line on the edge beneath; third black, with two yellowish-white stripes in front. Antennæ ochreous, with a black line above, terminating in black spots; basal joint with two black stripes in front. Fore-wings yellowish-brown, varied with blackish irregular striæ, chiefly from the costa, with a black dot on the end of the disk. The posterior margin is tipped with blackish; the cilia are yellowish-brown, containing two dark-fuscous hinder-marginal lines.

Posterior wings pale ochreous, cilia the same.

The larva tapers from the third segment anteriorly and posteriorly; flattened above and beneath, submoniliform; no dorsal papilliform points, but two rows on the sides; abdominal and terminal feet very short, the latter placed posteriorly. Head small, cordate, horizontal. The body is yellowish or pale greenish, the head, 1st, 2nd and 3rd segments black.

It binds the leaves of oaks together, in August and September, and picks out the parenchyma between the network of veins. In the latter part of September it weaves a slight cocoon between two leaves (in nature it is probably made elsewhere than between the leaves of its food plant), and becomes a rather short, thick pupa, with the antennæ-cases moniliform and longer than the wing-cases, beyond the end of which they project as an obtuse spine. It appears as an imago in March or April.

Labial palpi very long and recurved, the tips extending back as far as the prothorax, but remote from the face and head.

P. reflexella. Head brownish, tinged with ferruginous. Labial palpi dark ochreous, with a black line on the edge of the second joint beneath, and three black lines on the third, one in front and one on each side. Antennæ dark ochreous, annulated with dark fuscous; basal joint with two black stripes in front. Fore-wings dull ochreous, profusely dusted with reddish-fuscous; cilia short and dark-coloured. Hind-wings fuscous.

This species very closely resembles, physically, *M. tentoriferella.* The labial palpi are longer, however, more recurved, and the second joint perfectly smooth, whilst in *Tentoriferella* it is roughened with scales.

Both these genera likewise closely approach the European genus *Phibalocera,* and it is not impossible that one of them may be really identical with it, notwithstanding the longer

antennæ and shorter third joint of the labial palpi in the European species.

Menesta.

Fore-wings obtusely pointed above the middle, elongate-ovate. Disk closed by a very faint nervure. The subcostal divides into five nervules, the first of which is from the middle of the disk, the fourth being the apical, and the fifth the post-apical from the middle of the disk behind. The median is three-branched, the medio-posterior being opposite the third subcostal vein. The fold is thickened at its end and runs into the basal third of the median. The submedian curved, and shortly furcate at the base.

Hind-wings somewhat trapezoidal, slightly emarginate on the hind margin beneath the tip. The discoidal cell unclosed. The costal nervure is long and extended nearly to the tip. The subcostal somewhat attenuated at its base, distinct from the costal, and furcate at the apical third of the wing. The median three-branched, the superior and central veins on a common stalk.

Size small. Head and face smooth, minutely scaled. Forehead and face rounded and very broad. Ocelli none. Eyes vertically placed, minute, oval, salient. Labial palpi smooth, slender, curved and ascending equal to the vertex; second joint slightly thickened towards its end; third very slender, pointed and not more than one-half as long as the second. Maxillary palpi very short, distinct. Antennæ much separated at their base, about one-half as long as the fore-wings, filiform and ciliated beneath microscopically, *with one hair to each article;* basal joint very short, scarcely thicker than the stalk. Tongue scaled at the base, slender and about as long as the anterior coxæ.

M. tortriciformella. Labial palpi fuscous, towards the base whitish. Head, antennæ and face dark luteo-fuscous, the latter whitish beneath. Fore-wings dark brownish with a purplish hue, with a small lunate white spot on the end of

the disk. Hind-wings dark fuscous, cilia the same. Feet pale yellowish, the ends of middle and posterior tibiæ touched with fuscous; the middle tarsi fuscous externally, and the hind tarsi banded with fuscous at the base.

Nepticula, Zeller.

N. rubifoliella. Head dark luteous. Palpi somewhat paler luteous. Antennæ luteous, basal joint silvery-white. Fore-wings blackish-brown, with a rather narrow, curved silvery band about the middle of the wing. The band is concave toward the base of the wing and shows a tendency to be interrupted in the middle. Cilia whitish. Hind-wings grayish, cilia the same.

I have very carefully compared this insect with the description and delineation of *N. angulifasciella*, of Stainton, in the first volume of "The Natural History of the Tineina," and though unwilling to believe the fact, I cannot resist the conclusion, that it is the same species. I have not named the species in accordance with this conviction, because as yet I have secured but a single specimen.*

The larva mines the leaf of blackberry in September. It makes a blotch mine on the upper surface of the leaf, beginning as a slender gallery, extending quite a distance, usually along a vein of the leaf, before being enlarged into a blotch. The body of the larva tapers posteriorly, the terminal rings being attenuated; colour pale green, with a bright dark-green vascular line; head greenish-brown and small. The larva was not taken from the mine for description. It leaves the mine very early in October to spin an oval, very dark reddish-brown cocoon, and appears as an imago during the latter part of May, or early in June. There is therefore, in all probability, a summer brood, which may be found in July and August, if the conjecture is correct.

I have no doubt that subsequent observation will prove this insect to be the same as *Angulifasciella*, and I am no

* See *ante*, p. 42. H. T. S.

little astonished to find so minute a creature common to the continents of Europe and America. During the coming season I will endeavour to record minutely the history of the preparatory states of the American species.

[Here follow descriptions of several PHALENITES and PYRALIDÆ, viz:—

Doryodes acutaria,
D. spadaria,
Desmia maculalis,
Eustales Tedyuscongalis,
Hydrocampa? formosalis,
Cataclysta fulicalis,
C.? helopalis, and
Sironia maculalis.

Two pages are also devoted to a consideration of the difficulty caused to the American Entomologist, in the attempt to ascertain the American Lepidoptera described by M. Guenée by "the omission of synopses of genera," which, "when the number of them in his family groups calls for such tables, as it does so frequently, is a most serious, not to say, unpardonable, defect in the six volumes published by M. Guenée."]

[The 6th of Dr. Brackenridge Clemens' Contributions to American Lepidopterology, contained in the Proceedings of the Academy of Natural Sciences of Philadelphia, August, 1860, pp. 345—362, is entirely devoted to the Tortricidæ, which are reputed by Dr. Clemens as a family of the Tineina—he there describes the following forty species, viz.:—

Antithesia nimbatana,
A. bipartitana,
A.? coruscana,
Lozotœnia Rosaceana,
L. fervidana,
Peronea Viburnana,
Platynota sentana,
P. flavedana,
Anchylopera Spiræfoliana,
A. nubeculana,
A. Platanana,
A. striatana,
A. costomaculana,
Dysodia oculatana,
Stigmonota interstinctana,
Halonota simulana,
H. incanana,
Ephippiphora parmatana,
Amorbia humerosana,
Crœsia? reticulatana,
C.? sulfureana,
Pœcilochroma? dorsisignatana,
P.? similiana,
Monosphragis otiosana,
Lozopera? angustana,
Argyrolepia? lepidana,
Cœlostathma discopunctana,
Smicrotes peritana,
Exartema nitidana,
E. permundana,
E. versicolorana,
E. inornatana,
E. fasciatana,
Hedya Pyrifoliana,
H. Scudderiana,
Bactra? argutana,
Endopiza? Viteana,
E.? agilana,
Carpocapsa Pomonella,
and
Ioplocama formosana.

The following concluding remarks on the family Tortricidæ are too interesting to be omitted here.]

This group of insects is probably the most difficult, in a systematic point of view, and the least interesting family in

the order of Lepidoptera. The impression I have derived from the study of it, induces me to believe that it is owing chiefly to the artificial system by which it is at present interpreted, and which I have endeavoured to follow in this paper. Numerous families, or so-called families, have been arbitrarily instituted on the most trivial and untenable characters, some of which are only sexual peculiarities, while ornamentation appears to be a far more important element than structure, in the diagnoses by which they are characterized. Such an arrangement possesses a certain amount of convenience, inasmuch as it frequently enables the student or inquirer to limit the probable number of genera to which an insect he may wish to classify may belong. This, however, is its total significance, and even in this respect it is often deficient and deceptive. It* is a system of convenience and not of nature, which works on categories of structure and recognizable conceptions or ideas.

In my own view, from which, doubtless, many naturalists will dissent, ornamentation is purely an individual characteristic of species, and, although in general sufficiently constant, subject to a degree of variation in the same species that is often very considerable. Why should that which is unstable in species receive the stamp of scientific approval in the recognition of superior groups, instead of that which is constant and fixed, which is more or less indicative of modes of life, which is the expression in the imago of those categories of thought that we designate genera and families? I cannot perceive why it should be preferred, when I recall the wonderful fertility in structural invention which characterizes every natural family, and the logical connections that exist between all those groups of species composing its various genera. If the specific conception is the same in the preparatory states, and the structure of the various imagos that result is nearly identical, differing in some trivial peculiarity,

* For "*This* is," which appears in the original, Dr. Clemens has marked in pencil on the copy he sent me "*It* is." H. T. S.

perhaps, to which we are unable to assign any significant value, would it not be more scientific and convenient, more natural and philosophic indeed, to regard such individuals as forming a distinct group in the genus, to which they are evidently so intimately related, regardless of peculiarities of ornamentation?

What would be thought of that system in anthropography which separated men of the same race upon a long or a short nose, a large or small ear, thin or thick lips, or wide or narrow shoulders? I am not prepared to assert, that a principle like this has been introduced into the system which represents the present arrangement of this family, but when one recalls its comparative *poverty* in generic characters in the imago, or otherwise the extremely close relationship indicated in the diagnoses of many of its genera, the probability of something similar to it having existence is at least suggested to the mind.

It would be well if Entomologists would cultivate just and philosophic conceptions respecting the nature of the various groups at present recognized in our systems. No other department of Natural History offers, probably, equal facilities for observation and determining with accuracy the limits of generic and specific cycles. The mind however must be disabused of the fallacious notion that the imago is the most important part of species; that it is, indeed, the species; or that classification can be truly and properly made on this basis alone. Perfect insects are easily arranged systematically upon a consideration of their *entire structure*, its general agreements and special differences, but there are considerations more important than these involved in the idea of species.

The "imago" is no more the *species* which it represents as an individual, than the principal *noun* of a grammatical sentence is the *idea* which may be conveyed to our mental perceptions. Each is necessary to the other, each incomplete without the other, and when a hiatus exists in either case, we are placed simply in a region of conjecture, respecting the significance connected with the representative presented

to us. We have an object, but no idea. The noun and the imago may be well known to us, but until we have followed them through all the collateral terms in which they exist as the materials of thought, we cannot duly value the conceptions which may be connected with them.

The advocates of the Darwinian Theory of the origin of species would have us believe that species is an *abstraction;* that it represents nothing ideal; that in nature nothing but individuals exist, and in these must we look for the characteristics of species. The entire superstructure of reasoning on which the theory is built, is one that admits what is material in the specific group, probably because it is obvious to the senses of every one, but ignores the existence of that which is immaterial, intellectual, *spiritual* in every true specific creation, and which is to it as the soul to the material body of man; that which distinguishes the vital machine from mechanical inventions or imitations, created by the conceptions of the human mind. Nor does this belong to the imago alone, but is written in vital characters in the various transitional forms which belong to each species, in their organs, and their acts and manifestations of life, and intelligence or instinct. It is this, the definite conception, that casts each individual of a species in the same organic and instinctive mould, that cannot change. Individuals of the same species may change in ornamentation, but never in structure, unless as the consequence of amalgamation with another species, or an occasional abnormal modification, which is individual, not specific, and disappears with the individual. The creative fiat involved in the life of every species, and in its conditions, remains unalterable, because change in that which has an organic, vital and spiritual significance cannot take place without destruction to the species.

The supposition that "profitable variations of structure" may be initiated in the cell action of the reproductive system, in order that organisms may more successfully maintain an overestimated "struggle for existence," is simply a monstrous

physiological fallacy and assumption. If we suppose amalgamating influences to be inoperative, where do we perceive the evidences of it? The vegetable perpetuates itself by a germ, which already has its type distinctly impressed on it before the character of its architecture is developed by the effect of influences under which it is gradually worked out, cell upon cell, in one season or through a long series of years. In the annual the reproductive action is most probably, nay, there are well ascertained facts, which directly teach us that it is a simple process of *continuous growth in species*. Thus species have not a transient existence, but rather a terrestrial immortality. Individual life is ephemeral, specific life co-eternal with the existence of the conception producing the representative form. Individual lives are like the leaves of a deciduous tree, and having performed their functions are constantly shed, while the source of them continues to spread itself through space and time, until its appointed period has ended.

Under this simple view of species, supported alike by reason and all carefully collated physiological facts, how the study of the humblest branch of Zoology is ennobled! It acknowledges the existence in nature of a Principle as a creative power similar to our own minds. It deals with living thoughts, and seeks to represent, through many misconceptions and difficulties, the logical sequences existing amongst them, and to seize the hidden meanings which appeal to our intelligence in the ponderous volume on which they are inscribed.

NOTE.—The reader is requested to make the following corrections:—

In Paper 4, May, 1860, p. 160, for *Nomia*, read *Chrysopora*.* *Nomia* is already in use to designate a genus of bees.

In Paper 5, June, 1860, p. 219, line 21, for "graduation" read "gradation."

* See *ante*, p. 123. H. T. S.

[THE 7th of Dr. Brackenridge Clemens' Contributions to American Lepidopterology, contained in the Proceedings of the Academy of Natural Sciences of Philadelphia, November, 1860, pp. 522—547, is entirely devoted to BOMBYCIDÆ, ARCTIIDÆ, LITHOSIIDÆ and GLAUCOPIDIDÆ. The following species are described—

BOMBYCIDÆ.

Oylothrix salebrosa.

ARCTIIDÆ.

Ecpantheria Scribonia, Stoll,
E. caudata, Walker,
E. incarnata, Walker,
E. extrema, Walker,
E. obliterata, Walker,
E. nigriplaga, Walker,
E. simplex, Walker,
E. decora, Walker,
E. Cunigunda, Cramer,
Arachnis aulæa, Hübner,
Arctia caja, Linn.,
A. Dahurica, Boisd.,
A. Quenselii, Geyer,
A. gelida, Moschler,
A. virgo, Hübner,
A. Dione, Drury,
A. virguncula, Kirby,
A. Nais, Drury,
A. Phylira, Drury,
A. Placentia, Abbott & Smith,
A. virginalis, Boisd.,
A. hyperborea, Curtis,
A. Americana, Harris,
A. Parthenos, Harris,
A. fervida, Walker,
Ectypia bivittata,
Hypantria textor, Harris,
H. cunea, Drury,
H. Echo, Ab. & Sm.,
Spilosoma Isabella, Ab. & Sm.,
S. acrea, Drury,
S. Virginica, Fabr.,
S. congrua, Walker,
S. Jussiæ, Poey,
Euchætes Egle, Drury,
var.? *E. Eglenensis*,
Halesidota Caryæ, Harris,
H. annulifascia, Walker,
H. tessellaris, Ab. & Sm.,
H. fulvo-flava, Walker,
H. maculata, Harris,
H. bicolor, Walker,
H. insulata, Walker,
H. palpalis, Walker,
H. strigosa, Walker,
H. cingulata, Walker,
Hypercompa militaris, Harris,

Hypercompa confinis, Walker,
H. contigua,
H. Clymene, Esper,
H. fulvicosta,
Phragmatobia vagans, Boisd.
P. assimilans, Walker,
P. albicosta, Walker,
P. fuliginosa, Stephens.

LITHOSIIDÆ and GLAUCOPIDIDÆ.

Lycomorpha Pholus, Fabr.,
Ctenucha Latreillana, Kirby,
C. rubriceps, Walker,
C. venosa, Walker,
C. ruficeps, Walker,
C. fulvicollis, Hübner,
Aglaope Americana, Boisd.,
A. coracina,
Acoloithus falsarius,
Procris? Smithsoniana,
Malthaca perlucidula,
Crocota rubicundaria, Hübner,
C. brevicornis, Walker,
C. ferruginosa, Walker,
C. cupraria, Walker,
C. læta, Boisd.,
Atolmis? miniata, Kirby,
Nudaria? mendica, Walker,
Psychomorpha Epimenis, Drury,
Cosmosoma Omphale, Hübner,
Ormetica sphingiformis,
Cyanopepla cruenta,
Euchromia plumipes, Drury,
E. Pretus, Cramer,
and
Pœciloptera compta.]

This closes the series of Papers by Dr. Clemens in the Proceedings of the Academy of Natural Sciences of Philadelphia.

H. T. S.

CHAPTER III.

Papers contributed by Dr. Clemens to the Entomological Society of Philadelphia.

[Extracted from the Proceedings of the Entomological Society of Philadelphia, Vol. I. pp. 75—87, November, 1861.]

MICRO-LEPIDOPTEROUS LARVÆ.

Notes on a few Species, the Imagos of which are probably undescribed.

BY BRACKENRIDGE CLEMENS, M.D.

I PROPOSE to describe in the following paper, the mines and larvæ of a few of our American leaf-miners, to indicate their food plants and the months in which they should be sought for by the collector. The observations are taken from my notes, and refer to larvæ I have not been successful in rearing, or to those I have noticed out of season.

In general, it may be said, the mines of the leaf-miners are characteristic of the genus to which the larva may belong. A single mine, once identified, enables the collector to pronounce on the genus of all the species he may find thereafter. This added to the ease with which the larvæ are collected, and the little subsequent care required to bring them to maturity, except to keep the leaves in a fresh and healthy state, makes the study of this group in every respect pleasant and satisfactory to the Entomologist.

I feel confident that many of our intelligent and painstaking collectors would engage in the study with enthusiasm if once placed safely on the way. I can see no surer course than commencing with the larva, assuring the student that in such a month, on the leaf of a certain tree, he may find the larva of a certain "micro." The search for those indicated in the present paper can scarcely fail to result in the discovery of many other leaf-miners not alluded to here, and these will

surely be taken and carried home to ascertain the appearance of the imago. With this comes a desire to identify its genus and species, and thus in a few seasons, or even in a single one, the collector adds greatly to his stock of entomological knowledge.

If the search for leaf-miners is confined to forest trees, with which it is probably best to begin, the most favourable localities are the edges of a wood or forest bordering on cultivated fields, patches of young trees often found in fields, or even isolated trees, and the borders of a wood along streams. Some mines are most easily seen on the upper surface of the leaf, and others most perceptible on the under surface, and those which are transparent by placing the leaf between the sky and the eye.

The collector should be supplied with a tin box or canister of convenient size in which to place the mined leaves, separated from the tree at the end of the stalks, to prevent them from withering. If the top fits securely, leaves and parts of herbaceous plants may be kept fresh for several hours. He will render good service if he describes in a note book, the mine and the larva, both of which should be done with accurate minuteness (retaining likewise the mined leaf and numbering it), and the particulars of its transformation to a pupa, numbering the description and the vessel containing the leaf-miner. Two insects that are distinct, or suspected to be distinct species, should never be placed in the same breeding vessel. For the great majority of leaf-miners a common tumbler or drinking-glass, the top of which is made level by grinding with emery on a piece of sheet lead, covered with a piece of glass and containing a little white sand moistened with water, makes a very good breeding vessel.

The leaf, or if a large one a portion of it, is stuck into the moistened sand, and this together with the humid air of the interior of the vessel keeps it fresh.

Coleophora larvæ do not bear well confinement in the humid air of the breeding jar. To be successful in rearing the

larvæ, one must use a pot of moistened sand, in which the food plant is placed, covered with a glass cylinder, with fine gauze tied over the top; or the plant may be kept in water and covered with a cylinder of glass. For this purpose old chimney tops to lamps answer very well. The larvæ of this genus, taken in the fall of the year, hybernate in their cases until the following spring, and "feed up" on the first leaves that put forth. They must not, therefore, be kept in a warmed room during the winter. The pupæ of the fall brood of larvæ thrive much better, likewise, if not kept in a warm room during the cold months. The spring or early summer brood of larvæ produce imagos in a few weeks after entering the pupa state, and hence it is much more satisfactory to collect early in the year than during the latter part.

For convenience of reference, I append a table of months, designating the species included in this paper and their food plants, and intended to show when they should be looked for by the collector.

I shall be glad to hear from anyone who may find any of the larvæ and is successful in rearing the imago. At the same time he might communicate the fact to the Entomological Society for publication in their Proceedings, accompanied with a description of the imago and any observations on its natural history he may deem interesting or important. In the course of time, such a system would make the Journal an entomological necessity and provide a pleasant and instructive channel of communication between American Entomologists.

A CALENDAR SHOWING WHEN THE FOLLOWING LARVÆ SHOULD BE SOUGHT.

MAY.

Coleophora tiliæfoliella. Early to end. Leaves of bass-wood, *T. Americana.*

June.

Lithocolletis salicifoliella. Middle to end. Leaves of yellow willow.

Nepticula villosella. Latter part. Leaves of blackberry.

Lithocolletis juglandiella. Early. Leaves of black walnut.

July.

Catastega Aceriella. Early. Leaves of red maple.

Nepticula corylifoliella. Latter part, to middle of August. Leaves of hazelnut.

ostryæfoliella. Same time. Leaves of iron-wood, *O. Virginica.*

Platanella. Early. Leaves of button-wood, *P. occidentalis.*

saginella. Early. Leaves of oaks.

cratægifoliella. Latter part. Leaves of dwarf-thorn, *C. parvifolia.*

juglandifoliella. Latter part, to middle of August. Leaves of black walnut.

caryæfoliella. Middle to August. Leaves of hickory.

Aspidisca Saliciella. Early to middle. Leaves of yellow willow.

Nepticula villosella. Early to middle. Leaves of blackberry.

? *prunifoliella.* Leaves of wild cherry.

Amelanchierella. Early. Leaves of service-berry, *A. Canadensis.*

August.

Ornix quadripunctella. Early. Leaves of service-berry, *A. Canadensis.*

Lithocolletis juglandiella. About middle of the month. Leaves of black walnut.

Catastega timidella. Latter part. On oaks.

SEPTEMBER.

Aspidisca ostryæfoliella. Middle to middle of Oct. Leaves of iron-wood.
Nepticula virginiella. Early. Leaves of iron-wood.
rosæfoliella. Early. Leaves of dwarf wild rose.
Catastega timidella. Early. On oaks.
? *Hamameliella.* Early to middle. Leaves of witch-hazel.

OCTOBER.

Aspidisca ostryæfoliella.
Coleophora caryæfoliella.
Coryliella.
Viburniella.
Ostryæ.
Nepticula saginella. Early. Leaves of oaks.
Coleophora quercifoliella. Early. On leaves of oaks.
Nepticula platea. Early. Leaves of oaks.
anguinella. Early. On leaves of oaks.
corylifoliella. Very early. On leaves of hazel-nut.
Coleophora pruniella. Very early. On leaves of wild cherry.

COLEOPHORA.

Habits of the Larvæ.

The young larvæ feed either as miners in the interior of leaves or in the interior of seeds. When a leaf-mining larva has attained a certain age, it cuts out the two skins of the mined place and constructs of it *a portable case,* which it never abandons subsequently, except to construct a new one, when its increase in growth demands the change. In feeding the larva attaches its case to a leaf and bores into it between its skins, eating out a transparent patch, extending its body from the case for this purpose, but quickly retreats into it again if alarmed. Some of the seed-feeding species remain

within the withered flower, and therefore entirely concealed, until they are quite full fed. Others make a case of the husk of a seed, which they have eaten and are very difficult to distinguish from the untenanted seeds of the plant. The natural orders of plants that seem most frequented by the members of the genus are the *Caryophyllaceæ*, the *Leguminosæ*, the *Compositæ* and the *Labiatæ;* at least this applies to Europe and probably to our own country.

The larvæ, except when preparing to form a new case, make small mines, and the discovery of a leaf in which there are one or several transparent patches, and both the skins of the leaf entire, with one of them pierced with a minute hole, is a very certain indication that it has been the work of a *Coleophora* larva.

The larvæ hybernate in their cases during the winter and produce imagos in the following summer, "feeding up" during the spring.

Some of the insects named here from the larvæ may, possibly, have been named and described in the perfect state.

1. *C. caryæfoliella.* The larva mines the leaves of hickory in September and October. The head and body is reddish-brown, somewhat darker on the second and third rings.

The case is small, dark brownish, and in form is a flattened, simple cylinder. The larva feeds only in small, rectangular patches, of which there are usually several in the same leaf. The case is fixed to the under surface, and the larva feeds in one patch until it is compelled to remove its entire body from its case, and then removes to another part of the leaf to form a new mine. The fall larvæ may doubtless be taken in the spring or early summer.

I have likewise found a case like the above on the leaves of dogwood. The case I found was attached to the midrib of a leaf; I have not noted the existence of a mine.

2. *C. corylifoliella.* The larva mines the leaves of hazel in September and October. It is pale brown, with dark-

brown thoracic, dorsal spots. The case is three lines long, dark brown, irregularly cylindrical, compressed or flattened at its hinder end, with two teeth about the middle of the upper edge, separated from each other about one-third of the length of the case, and dilated somewhat or rounded on the lower edge between the teeth. Mouth of case not deflected. The mine of the larva is nearly circular.

3. *C. Viburniella.* The larva mines the leaves of *Viburnum prunifolium* in September and October. The head and body is dark brown, with blackish thoracic patches on the second and third rings.

The case is irregularly formed. It is reddish-brown, nearly cylindrical, with a deflected mouth, and tapering at the hinder end; on the upper edge, running up from the mouth of the case, is a flattened wing-like appendage serrated on its upper edge, nearly equal to one-third of the case in length.

The lower case is dilated near the middle or undulating, and near the hinder end above and below there is a slight projection. The case is attached to the under surface of the leaf, and the mine is an irregular blotch.

4. *C. Pruniella.* The larva mines the leaves of wild cherry early in October, when it is more than half grown.

The case is flattened, having a notch on the upper edge about one-third from the mouth, whence it is curved regularly to the hinder end, and the under edge is nearly straight from the mouth to about one-third of the length from the hinder end, where it is deeply notched and curved towards the upper edge, thus forming a tail-like appendage. On the upper edge, from the mouth of the case to the anterior notch, the edge is regularly curved.

5. *C. Ostryæ.* The larva mines the leaves of iron-wood, *Ostrya Virginica,* in October and during spring.

The case is flat, rather wide, and the edges nearly parallel

except near its mouth. The upper edge is slightly curved, and almost at the hinder end is a slight notch, which is sometimes wanting, and the hinder end is squarely excised. Colour of the case pale reddish-brown.

6. *C. Tiliæfoliella.* The larva feeds on the leaves of the linden from the beginning to the latter part of May.

The case is black, somewhat pistol-formed; straight along the upper edge, turned abruptly down so as to form a handle-like appendage behind, with a toothed, flattened projection about the middle of the under edge, whence to the mouth of the case it is cylindrical. The body of the larva is dull, dark brown and the dorsal plates and head black.

At this date the larva does not mine the leaf, but eats holes in it, devouring its substance. The case is fixed to the under surface of the leaf, and is easily seen, even on the leaves of the higher branches.

The larva enters on pupation in the latter days of May or early in June.

7. *C. Querciella.* The larva feeds on the leaves of oaks in October.

It does not make a mine at that date, but picks out the parenchyma of the leaf from the under surface, leaving the net-work of veins and the upper epidermis of the leaf entire.

The case is blackish-brown and smooth, the larva permitting the lower edge of the case to come in contact with the leaf. The case is slightly pistol-formed; the portion near the mouth circular and deflected, beyond which it widens and rises on the upper edge to a hump or projection about the hinder third, whence the outline descends to the posterior end, which is squarely excised. The under edge is curved to a notch nearly opposite to the hump on the upper edge.

The habits of the larva are similar to the European *C. ibipennella;* but the case differs from it in form.

LITHOCOLLETIS.

Habits of the Larvæ.

The larvæ mine the leaves of trees, shrubs or low plants, separating either the upper or lower cuticle and feeding on the inner substance of the leaf. When the mine is on the upper surface, or at least most frequently when it is in this position, the leaf becomes folded and curved at the place mined, and the separated cuticle is gathered into folds or covers the curved portion so as to make a capacious habitation. Some of the miners of the upper surface of leaves make large blotches or tracts, and when the mines are fresh the separated cuticle is whitish and very noticeable. The miners of the under surface cause the upper cuticle to be discoloured in patches, and this with the fold of the side of the leaf is often sufficient to indicate the presence of a mine.

Usually the species are confined to a single plant; some, however, feed on several allied plants.

The larva never quits the mine and changes in it to a pupa. Some species make no cocoon, others only a very slight one, and others make one of grains of excrement woven together with silk.

Many of the species of the fall brood remain in the pupa state during the winter, and appear as imagos in the spring, and some of the imagos that appear late in the fall seem to hybernate during the winter in the imago state. The spring brood of larvæ produce imagos in the summer.

When the imagos escape from the mine the pupa case is thrust through the separated cuticle, and left there after the escape of the imago.

1. *L. salicifoliella.* During the latter part of June or early in July the leaves of yellow willow, *Salix vitellina*, var. *S. alba*, should be searched for this insect. The mine is on the under surface, usually near the base of the leaf and along the edge. I found these mines for the first time on the 23rd of July of the present year, but they were untenanted,

and the imagos had escaped, so that I am unable to furnish any further particulars respecting the species.

2. *L. juglandiella.* The larva makes an elongated, rather wide tract on the upper surface of the leaves of black walnut, without folding the leaf, and may be found from the beginning to the middle of the month.

Itis blackish or blackish-brown, with a few pale-brownish dots on each side of the thoracic segments, and with the tip of the abdomen and head pale brown. It belongs to the second* larval group described in the Proceedings of the Academy of Natural Sciences of Philadelphia, November, 1859, and may not be specifically distinct from *L. caryæfoliella*, described on page 323.†

Aspidisca.‡

Habits of the Larvæ.

The larvæ of this genus are characterized by making a small blotch mine between the cuticles of the leaves, and when they have arrived at maturity weaving a cocoon between the cuticles, and cutting out of them a small, oval disk, thus leaving a hole in the mined place of the size and shape of the cocoon. In this respect they resemble the genus *Antispila.*

The larvæ of the two genera are, however, easily distinguished by their colour; the *Antispila* larvæ are white or whitish, with black dorsal and ventral spots, while the *Aspidisca* larvæ are reddish-brown. The disk of the latter is likewise always fixed by a button of silk to some object in the neighbourhood of the food-plant, and the pupæ must be kept in a dry vessel after the disks have been cut out, otherwise the insects will not come to maturity. On the other hand the *Antispilæ* require a damp situation after entering the pupa state.

* See *ante*, p. 63. H. T. S.
† See *ante*, p. 74. H. T. S.
‡ See *ante*, p. 104. H. T. S.

1. *A. ostryæfoliella.* The larvæ may be found on the leaves of iron-wood during the latter part of September and early in October.

About the 10th of October all the mines are untenanted. There may be a spring brood in the leaves of the *Ostrya*, but I have not observed them.

The mine is large when compared to those found in the leaves of other plants, and the hole left by cutting out the disk is out of proportion to the size of the mined portion.

2. *A. saliciella.* From the beginning to the middle of July the larva may be taken on the leaves of yellow willow. The mine is very small, the excised portion, with which the disk is formed, taking up the greater portion of it. I noticed in this larva a habit, which may be generic, but if so it has escaped my observation: the larva, after cutting out its disk, lets itself down by a thread, and in the middle of July the disks may be found suspended under willows as the larva lets itself down to the surface of the ground. My specimens were taken on July 23rd, when the mines were generally deserted.

A larva of this genus mines the leaves of wild cherry in July. The mines are usually near the base of the leaf, and are more elongated than any others I have found. The mine is a short tract, not broader than the short diameter of the disk, which is cut out from the end of the mine, the hole occupying its entire breadth. If the species is distinct, and this I am disposed to doubt, it may be called *A. pruniella.*

Nepticula.

Habits of the Larvæ.

These larvæ mine very narrow serpentine paths in the interior of leaves, the mine being always on the upper surface.* The mines vary much in form, being sometimes a

* The larva of the European *N. trimaculella* mines indifferently both surfaces of the leaves of *Populus nigra.* H. T. S.

slender gallery or line, either simple, or enlarged towards the end into a blotch, or a complete blotch.

When the larva is full fed, it quits the mine, cutting for this purpose the separated cuticle, in order to weave a minute cocoon.

The larvæ of some Dipterous insects make mines that strongly resemble those of some of the *Nepticulæ*, but they may usually be distinguished by the more maggot-like appearance of the former.

1. *N. corylifoliella.* The larva makes a long, winding, narrow tract in the leaves of hazel in the latter part of July and the beginning of August, and the fall brood may be found early in October. The *frass* or excrement of the larva is deposited along the middle of the tract, forming a minute central black line. The edges of the mine are smooth, and but little broader throughout its extent than the width of the miner.

The mine is left transparent by the larva from the beginning to the end.

There is another miner in this leaf that I suspect to be a Dipteron. It makes a rather broad, tortuous tract, much broader than the preceding, and the "frass" is *scattered in separated grains* along the middle of the tract.

2. *N. ostryæfoliella.* The larva in July and August makes a rather wide, most frequently much contorted, transparent mine, *with a narrow, central, black line of "frass;"* sometimes the early portion of the mine is filled up with "frass," and in others the line of frass is distinct from the beginning. From the middle to the end of the mine whence the larva escapes it will average nearly a line in width.

3. *N. Virginiella.* In the leaf of iron-wood, *Ostrya;* makes a very narrow, long tract, not broader than the width of the larva, *the interior of which is filled up with dispersed grains of frass,* and which is dark brown whilst the larva is

mining. The larva is very slender, of nearly uniform diameter, terminal segments pointed, pale green, with a darker green central line; head pale brown. It should be sought early in September.

On the 14th of the month it is nearly full fed.

4. *N. Platanella.* From the beginning to the middle of July the blotches produced by these larvæ may be found on the leaves of the button-wood tree or sycamore. The blotch is often extended over the early portion of the mine, so as to obliterate it, and again the early portion is present, being a slender line from which the blotch is formed.

The larva is pale green and the head pale brown, and weaves a cocoon of a reddish-brown colour during the latter days of July.

5. *N. cratægifoliella.* The larva may be found in the leaves of dwarf thorn, *Cratægus parvifolia*, from the middle to the latter part of July. The mine is rather a wide tract, not long, most often tortuous, sometimes turned back on itself and when nearly straight, with irregular edges, having a narrow, contorted line of frass running through the middle of it. The later half of the mine will average at least a line in width.

The larva is rather thick, bright green. One larva which I observed especially mined a space of *five lines in three days*, at the end of which time it was full grown. Previously it was not more than half grown, and the distance mined while under observation forms nearly one half the length of the entire mine. The larva enters the pupa state during the latter part of July.

6. *N. juglandifoliella.* The larva mines the leaves of black walnut from the latter part of July to the middle of August. The mine is a very narrow, whitish tract, very often recurved and slightly tortuous, somewhat, although slightly, enlarged at its end, with a very narrow central line

of "frass." The larva is pale green, almost whitish, rather thick and resembling a Dipteron.

I found a single specimen on the 27th of last August, when the mines appear to be usually untenanted, and, very oddly, it escaped from its mine as I held the leaf, whilst looking unsuccessfully for another specimen.

7. *N. caryæfoliella.* In the leaves of hickory late in July and early in August. The mine is very like the preceding, but rather wider and longer and not so tortuous, but nearly always recurved and with the central "frass" line. The larva is pale green, with a dark green central line and brownish head. It is nearly or quite cylindrical, diameter uniform, the anal segments pointed.

I have taken a specimen as late as the 30th of August, but at this date almost every mine found is untenanted.

8. *N. villosella.* May be found in the leaves of the blackberry about the middle of July. The mine is very narrow, only about wide enough to accommodate the miner, tortuous, with a central frass line. The larva is pale brownish and leaves its mine during the latter part of July.

This differs from *N. rubifoliella* (see Proc. Acad. Nat. Sc. of Phila., June, 1860, p. 214) * both in the mine and colour of the larva.

9. *N. Amelanchierella.* In the leaves of service-berry or June-berry, *Amelanchier Canadensis*, in June and July. The mine rather a broad tract, sometimes much contorted, with rather irregular edges, placed most often towards the base of the leaf and having a rather broad "frass" line of a dark-brown colour.

10. *N.? prunifoliella.* Mines resembling those of the *Nepticulæ*, may be found in the leaves of wild cherry, *Prunus*

* See *ante*, p. 152. H. T. S.

serotina, during the latter part of July and early in August. It is more or less blotchy in the beginning, with frass dispersed and towards the end gathered into a rather broad line, with the grains distinct. I have never found them tenanted, and it is quite possible that they are the work of Dipterous larvæ. The mines are reddish-brown after the larvæ leave them.

11. *N. anguinella.* May be found in the leaves of oaks early in October and in the latter part of June. The mine is a very narrow serpentine tract, *which is filled or discoloured throughout its length by blackish excrement.* The larva fits the mine closely, in colour lemon-yellow, with ten square dark brown or blackish spots on the ventral surface.

Other mines in the same leaves have, sometimes, a broad frass line, sprinkled along the middle and often it begins as a slender line, and these doubtless all belong to the same species.

12. *N. platea.* Mines oaks early in October. The mine is a moderately broad, winding tract, with a broad line of dispersed grains of excrement. The larva is purplish, with a pale-green vascular line and a row of reddish-brown dorsal dashes. The mine is much broader than that of the preceding miner.

13. *N. saginella.* Mines oaks early in October. I have found the larva abundant in the leaves of chestnut early in August. The larva makes a transparent, moderately broad, serpentine tract, gradually increasing in breadth from the beginning to the end, where it is very slightly enlarged, with a central black frass line. It is about a line wide towards the larger end, and from twelve to fifteen lines long. In the leaves of chestnut the mine is often made along the edge of one of the coarse pointed teeth, running up to the point, whence the enlarged portion is turned inwards. In this leaf the mines are only twelve lines long.

The larva is dark bright green, with a darker vascular line; head brownish. The body is rather thick, and of nearly uniform diameter. The summer brood leave their mines towards the latter part of August, and in oaks, I think, in July.

There may be found in oaks a mine very similar to the above, that is about a line wide towards its larger end, but which is about *two-and-a-half inches long.** And another much narrower than either, which is not much contorted, but nearly straight, running along the veins and midrib and measuring at least *four inches in length.*

14. *N. rosæfoliella.* In the leaves of dwarf wild rose, *Rosa lucida*, early in September. The mine is very serpentine, frequently running around the edge of the leaf including its teeth, moderately broad, nearly filled with a broad blackish-brown frass line, the grains of which are dispersed or have a wavy arrangement in the later part of the mine. In the early portion, the tract is filled with the excrement of the larva.

The larva is lemon-yellow; head and spot on the middle of the second segment pale brown. I have no doubt about the distinctness of this species from any other mining the leaves of plants allied to the rose family.

It may however be identical with or closely resemble the European *N. anomalella.*

Ornix.

Habits of the Larvæ.

In early life the larvæ are leaf-miners and make mines on the under surface of leaves, difficult to be distinguished from those of the genus *Lithocolletis.* Towards maturity, however, they abandon their mines and feed under a portion of a leaf turned down from its edge, which is bound closely with silk.

* Perhaps the mine of a *Lyonetia*, allied to *L. Clerkella.* H. T. S.

When they are full fed, a small portion of the edge of the leaf is turned over and the larva weaves its cocoon within the cover thus made.

O. quadripunctella. Early in August the larva may be found in the leaves of June-berry or Service-berry making Lithocolletiform mines on the under surface. Towards the middle of the month, it abandons its mine and feeds under a turned-down portion of the leaf. The larva is dirty greenish, with four black dots on the head and four on the dorsum of the second segment. It weaves its cocoon, which is reddish-brown, during the latter part of the month.

Catastega.

Habits of the Larvæ.

The insects included in this genus are not leaf-miners, although they belong to the division of Micro-Lepidoptera. I am not, perhaps, justified in forming a genus from the characters and habits of the larvæ, and would not do it, if I were not convinced that the genus is undescribed. The insects may not belong to the group *Tineina*, and if not they most probably belong to the *Phycites*.

The larvæ make tubes in which they live, with the grains of their excrement and silk, on the underside of leaves, covering them with a tent or sheet of closely-woven silk, under which they feed by picking out the parenchyma of the leaves. They are extremely timid, and do not begin to feed or weave until after night-fall. As the tube is increased in length, the silken tent is likewise advanced as it is necessary for the insect to obtain new feeding-grounds.

1. *C. timidella.* The tube of the larva may be found on the underside of oak leaves in the latter part of August and early in September.

The larva is semi-cylindrical, wrinkled transversely, with a shield on the second segment; head small, pointed. It is

very dark, concolorous green, shield paler; head pale brown, varied with darker brown.

The tube is very long, cylindrical, enlarging from the beginning, which is a mere thread until it attains considerable thickness. The open extremity is covered by a web, in the middle of which is a gallery lined on each side with frass, and the larva passes through it in order to feed. In feeding the larva leaves the outer cuticle and the net-work of veins entire.

About the middle of September the larva abandons its tube to form a cocoon on the surface of the ground. I have seen numbers of this larva on oaks in Minnesota, near St. Paul.

2. *C. Aceriella.* The larva forms a moderately long, slender, cylindrical tube at the base of the leaf of maple, *A. rubrum*, early in July, and is covered with a thin transparent web closed in advance. The tube increases in diameter from the beginning to the end and is placed between two principal veins of the leaf, and the web is extended from one vein to the other.

3. *C.? Hamameliella.* The larva constructs a little, short tube of frass along the midrib of the leaf of witch-hazel, *Hamamelis Virginica*, during the latter part of September. The tube is begun in the angle made by a vein and the midrib, and the triangular space between them is covered with a thin web of silk, having beneath it the tube.

The larva is nearly cylindrical, slender, with the head pointed. It is of a uniform, rather pale-green colour.

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NEW AMERICAN MICRO-LEPIDOPTERA.

BY BRACKENRIDGE CLEMENS, M.D.

Opostega, Zeller.

Discoidal cell of wings open. Hind-wings extremely narrow, linear-lanceolate. The subcostal vein is central and becomes trifid beyond the middle of the wing, sending an extremely short branch to the costa from the point of subdivision and two long branches, one of which runs to the tip of the wing and the other to the inner margin. The median vein is distinct, curved, simple and nearly joined by the inner extremity of the subcostal vein. The submedian distinct and short.

Fore-wings pointed, almost caudulate, but appearing from the cilia to be dilated posteriorly. *All the veins simple, parallel, without branches, some much attenuated and none extended to the tip of the wing.* Subcostal vein much attenuated, nearly obsolete, equally remote from the costa and the median vein, which is thickened and distinct, and runs through the middle of the wing without reaching the inner margin below the tip. The fold of the wing is distinct, with a parallel, much attenuated nervule above it, arising at the extreme base of the median. The submedian vein distinct, thickened.

Head smooth above. Face mostly on the inferior surface of the head, extremely narrow, hairy beneath and between the antennæ in front. Eyes oval, obliquely placed, almost concealed by the antennal eye-caps. Antennæ with the

basal joint expanded into a large eye-cap, which is thin and cup-like anteriorly. Labial palpi hidden on the under surface of the head, short, drooping, with the terminal joint very short. No maxillary palpi. No tongue.

O. albogaleriella. Silvery-white. Fore-wings with a minute black dot at the *extreme apex of the wing.* Hind-wings and cilia somewhat yellowish-white.

This insect is very interesting, as it is the first extra-European member of the genus, as well as I can ascertain, that has been described. The imago was found on the table under my gas-light on the morning of the 9th July. It was only slightly injured, the stalks of the antennæ having been burned off and the cilia of one pair of wings a little burned.

None of the larvæ belonging to this genus have been discovered.*

TRICHOTAPHE, Clemens.

T. flavocostella. G.? flavocostella, Proc. Acad. Nat. Sci. May, 1860, p. 162.†

I have not met with another specimen of this insect, but have been enabled to determine its genus from the following, which resembles it closely in many respects. These insects must be handled very carefully when they are taken, as the labial palpi are easily detached even whilst they are living.

T. alacella. Labial palpi: second joint orange-yellow, terminal joint tinged with fuscous. Head deep brown above, iridescent. Face shining pale yellow. Antennæ deep brown. Fore-wings deep brown, with a steel blue, shining streak along the costa, extending from the base to an orange-yellow costal spot at the beginning of the apical cilia, and deeply excised in the middle of the wing. Beneath the excised portion and near the inner margin is a short, steel-blue streak, and the costal streak emits a slender line to the inner margin, opposite

* See note, p. 45. H. T. S.

† See *ante*, p. 113. H. T. S.

the costal orange-yellow spot. Hind margin with a series of steel-blue dots. Cilia brown. Hind-wings fuscous; cilia a little paler.

Taken on wing 17th of July.

SOLENOBIA? Zeller.

In the hind-wings the costal vein is well developed and placed close to the costa. The subcostal vein is simple, giving rise near its middle to an angulated discal vein, which sends off a branch to the margin beneath the tip and receives the discal fold at its angle. The median subdivides into *four branches, the two superior branches having a common origin*, the others short and equi-distant.

The subcostal vein of the fore-wings sends off a long, decided marginal branch from the basal third; about the middle of the wing forms a long, rather large secondary cell, from the hinder end of which arise two marginal branches, and from the point where the lower branch of the secondary cell enters the discal two other branches arise diverging from their origin, one to be delivered above and the other beneath the tip. Opposite the discal fold arises another branch, running to the margin beneath the tip, and the median vein subdivides into three nearly equi-distant, short branches, the posterior of which is nearly perpendicular to the inner margin. The submedian is short and furcate towards the base for half its length.

Head hairy above and in front; without ocelli. Eyes small, spherical, slightly naked above. Cephalic stigmata very large and distinct. Antennæ setaceous, scaly and tufted slightly above towards the end, ciliated beneath. *Maxillary palpi, labial palpi and tongue undeveloped.*

S.? Walshella. Head and face dark gray. Antennæ dark gray, slightly spotted with white. Fore-wings pale gray, varied with fuscous sprinkled over the surface, without defined markings, except along the costa near the tip, where there are a few pale gray or whitish spots. Cilia gray. Hind-wings gray.

I received a specimen of the above insect some time since from my esteemed friend Benj. D. Walsh, of Rock Island, Ill., who was compelled to fix it to a strip of card for the want of small pins. The specimen may have been injured in its parts by this treatment, but I cannot discover any injury. He likewise forwarded at the same time a specimen of the case, which is earth-brown in colour and consists of silk, granulated with particles of fine sand, and therefore the larva could not have been a wood-miner, as Mr. Walsh at first supposed. The larva is in all probability lichenivorous and feeds in the portable case in which Mr. Walsh found it in the fall. I sincerely hope the discoverer of the species will not fail to ascertain the natural history of the larva and put it on record in the pages of the "Journal," for I know no one who can do this more pleasantly and accurately.

In his letter to me Mr. Walsh says: "The little moth I sent you is certainly not a 'wood-miner,' although it occurs in the bark of shag-bark, hickories and other trees with scaly bark. From finding the larva late in the fall and the winter enclosed in its case in that situation, I had supposed that it fed under the bark; but I ascertained in August and September that it was not there, and therefore conclude that it merely retires there to become a pupa. I noticed an individual apparently identical this winter attached to a pine-board fence. There was not the least appearance of 'mining' under the bark, by which I understand cutting a channel similar to other boring insects."

Only the males of the genus *Solenobia* are winged, and the females have attracted much attention recently, in consequence of the fact that they lay unimpregnated fertile eggs.

Nepticula.

N. fuscotibiella. Antennæ dark fuscous, basal joint silvery-white. Head reddish-yellow. Fore-wings purplish-fuscous, with a rather broad, slightly oblique silvery band exterior to the middle of the wing. On the costa of the wing the band

is rather nearer to the base than on the inner margin; cilia pale grayish. Hind-wings pale gray, with pale-gray cilia. Thorax dark fuscous, with a purplish hue. Legs and abdomen beneath yellowish, with a brassy lustre; the hind tibiæ fuscous.

Taken at light on the 11th of August.

N. bifasciella. Antennæ pale fuscous, basal joint silvery. Head pale reddish-yellow. Fore-wings dark bronzy-green, somewhat purplish at the base, with two silvery bands; a rather broad, straight one on the basal third of the wing and a narrower straight one on the apical third; cilia gray. Hind-wings gray, with gray cilia.

At light, 11th of August.

*N. Platanella.** Antennæ dark fuscous, eye-caps large, silvery. Head reddish-ochreous. Fore-wings dark brown, with a small white, slightly silvery spot on the middle of the inner margin and a very short costal streak of the same hue opposite to it. The cilia very pale yellowish, and the scales behind the cilia of the same hue, tipped with dark brown. Hind-wings yellowish-fuscous; cilia fuscous.

Imago during the latter part of July.

Lyonetia, Hübner.

The hind-wings are setaceous. The subcostal is placed nearly in the middle of the wing, is bifid from about the middle, sending a small branch to the costa and a long one along the inner margin to the tip. The median vein is very distinct and simple.

Fore-wings *caudate*, when denuded. The discoidal cell is very long and narrow, acute behind. The subcostal vein sends two branches to the costa, a moderately long one from the middle of the cell and one just behind the acute angle of the disk. (In European specimens there are three subcostal branches, two of which are given off near the end of the disk.)

* See *ante*, p. 173. H. T. S.

The apical branch and the superior branch of the median vein arise at the angle of the disk, the former of which is trifid, sending a branch to the costa at the beginning of the slender tail, another to the inner margin a little beyond it and a branch to the tip of the wing. (In European specimens the apical branch is represented simple.) Median vein two-branched. *The submedian with a long fork at its base.*

Head smooth with appressed scales, face broad and retreating, slightly tufted above with erect scales. Antennæ *as long as the anterior wings*, slender, with a moderate-sized basal eye-cap, partly concealing the eyes. Labial palpi slender, cylindrical, ascending (in the living insect) to the basis of the antennæ, much separated; in the dead insect, drooping and applied to each other. Tongue naked, a little longer than the labial palpi.

L. speculella. Head, face and palpi pure white. Antennæ slightly fuscous, basal joint white. Fore-wings pure white, with a bronzy-fuscous streak on the inner margin, which is obliquely inclined to the tip of the wing, extending a little above the fold and pointed behind, and a short streak of the same hue behind it and nearly parallel to the inner margin. Near the apical portion of the wing are four bronzy-fuscous costal streaks, the most interior one of which is oblique and the others nearly vertical and more or less united in the middle of the wing, and at the extreme apex is a black spot. Hind-wings darkish gray, with gray cilia.

Imagos on wing the 5th of August.

The larvæ of this genus are represented to make long, tortuous galleries or tracts in leaves, and to quit the leaf when full fed. I have never bred an imago of this genus, nor can I say with certainty that I have met with a larva belonging to it. I suspect, however, that the mine presently to be described is the work of one of them, although the larva much resembles *Phyllocnistis* in its habits.

The mine to which I refer may be found during the latter part of August in the leaves of wild grape-vines. It is very long, winding, linear and narrow, *filled with blackish frass* and hence easily seen, differing thus from a *Phyllocnistis* mine, which resembles the tracings left on leaves by snails. When the larva is full fed, it enlarges the mine at its extremity, without making the enlargement transparent, and, making a fold in the leaf at this point, weaves its cocoon and undergoes its transformation in the mine like a *Phyllocnistis* larva. The larva is pale greenish, immaculate, *long and very slender, with the anal segments very pointed.*

Since writing the preceding remarks on the larva which makes the blackish mine in wild grape leaves, and which I suspected might be a *Lyonetia*, I examined one of the pupæ I had obtained from the miner. This although dead had completed its full development, and the markings on the wing, extracted from its wing-case, were beautifully distinct. The imago was certainly not *L. speculella.* In its unexpanded state, a wing is quite opaque and the neuration very indistinct, and I judge that the chitinic matter of the veins is not secreted until after the escape of the imago from the pupa-case. The neuration of the insect under consideration was that of *Phyllocnistis*, and so also was the ornamentation of the wing; and it appeared to me to be distinct from that of *P. vitigenella*, although very similar to it.

Tenaga, new gen.

Hind-wings lanceolate. Without discoidal cell. The costal vein is delivered to the costa about its apical third. The subcostal simple, almost or quite obsolete from the middle to the base of the wing. The discal vein is central, much attenuated through the middle of the wing, giving rise to a branch to the inner margin about the middle of the wing, the base of which is extremely attenuated, becoming furcate

about the apical third, delivering both branches to the inner margin beneath the tip. The median vein is two-branched, the superior one angulated in the middle.

Fore-wings ovate-lanceolate. Discoidal cell very narrow and placed rather beneath the middle of the wing. The subcostal vein is rather indistinct, sending off a costal branch from the costal third, and near the end of the cell two costal branches, *the second one of which is furcate and much attenuated from the bifurcation to its origin.* Near this last branch arises *another furcate branch, much attenuated towards its base*, both of whose branches are delivered to the inner margin beneath the tip of the wing. The median vein is three-branched. The submedian simple.

Head and face rough, hairy. Without ocelli. Eyes very small, hemispherical, with a narrow space around, naked. Antennæ nearly as long as the fore-wings, setaceous, simple. Labial palpi, in the living insect, ascending to the middle of the face, rather slender, cylindrical, smooth and almost concealed in the facial hairs; middle joint slightly thickened and roughened with scales beneath, with terminal bristles; terminal joint about half as long as the middle joint; in the dead insect, the palpi are drooping and divergent. *No maxillary palpi. No tongue.*

17. *T. pomiliella.* Head and palpi dull ochreous. Antennæ dark fuscous. Fore-wings yellowish-ochreous, with a black spot on the costa at the base of the wing, and with three black bands; one near the base, one rather behind the middle of the wing, and one about the apical third, interrupted more or less in the middle. In the spaces between the bands are scattered black scales. The extreme apex of the wing is blackish, with two costal spots of the same hue between the third band and the apex, and two or three along the inner margin behind the apex, some of which are indistinct. Cilia of the general hue. Hind-wings and cilia grayish-fuscous.

Taken on wing 27th of July, in damp wooded places.

HYBROMA, new gen.

The venation and form of the hind-wings are much like that of *Tenaga*. The costal vein enters the costa about its middle. The subcostal is simple, almost obsolete posteriorly. The discal vein is central, much attenuated behind, giving rise behind the middle of the wing to a branch to the inner margin, attenuated at its base, and at the apical third of the wing *becomes bifid, sending one branch to the costa above the tip and the other to the inner margin beneath it.* The median runs straight to the inner margin and is two-branched. Without discoidal cell.

Fore-wings ovate-lanceolate; the subcostal vein is much attenuated from its middle and gives rise to *a costal branch behind the basal third* and forms a rather large secondary cell, the branch forming it almost obsolete, and from its hinder end throws off three costal branches nearly equi-distant. Beneath these arises the apical branch, which is simple and delivered to the costa behind the tip. Two other branches are given off from the disk to the inner margin beneath the tip. Median vein three-branched. Submedian simple. Discoidal cell fusiform, rounded behind.

Head and face rough, hairy. Without ocelli. Eyes very small, hemispherical. Antennæ *rather more than half so long as the fore-wings*, setaceous and simple. Labial palpi slender, cylindrical, much separated; middle joint with short terminal bristles; terminal joint nearly as long as the middle, deflected. *Maxillary palpi long, folded, four or five jointed. Tongue very short*, reaching to the end of the middle joint of labial palpi.

H. servulella. Head and palpi pale yellow, the latter fuscous beneath. Antennæ dark fuscous. Fore-wings sulphur-yellow, with a dark fuscous streak along the costa from the base, slender at first, but enlarged into a spot about the middle of the costa; a band of atoms of the same hue, commencing on the costa at the beginning of the apical cilia, and

a streak of the same hue along the inner margin, with its hinder end turned up obliquely towards the costa. Hind-wings dark brownish.

Taken on wing 18th of July.

The venation of *Eudarcia*, *Tenaga* and *Hybroma* is much alike, particularly that of the hind-wings; the species included in them are congeneric, and to the group thus formed, that of *Diachorisia* may be likewise added. If we disregard the significance of venation, the number of genera can be reduced. But nature does not make variations of structure without attaching to the change some difference of habit, some distinction in the biography of the individual. I have no doubt of the naturalness of the genera, and they are probably peculiar to our own country.

[Here follows a description of a TORTRIX, *Dysodia margaritana*. H. T. S.]

[Extracted from the Proceedings of the Entomological Society of Philadelphia, Vol. I. pp. 147—151, March, 1862.]

NORTH AMERICAN MICRO-LEPIDOPTERA.

BY BRACKENRIDGE CLEMENS, M.D.

BEDELLIA SOMNULENTELLA.*

IN the January number of the Proceedings of the Academy of Natural Sciences for 1860, page 8,† I described a species of the genus BEDELLIA under the specific name *Staintoniella.* Subsequently Mr. Stainton, of London, pronounced our American species to be the same as the European, and kindly sent me specimens for comparison. Our insect should hence be known as *somnulentella,* the name of the European species with which it is identical.

Early in last October, a little friend, who amuses himself by searching for mined leaves for me, brought me some leaves of the Morning Glory (*Ipomœa purpurea*), in which he had detected mines. It instantly occurred to me that they were the work of a species of *Bedellia,* as I knew this to be the food plant of the genus. The leaves were put in breeding vessels, and in due time I had the satisfaction to secure a number of imagos. The species is double-brooded; the last brood appearing during the latter part of October and early in November.

The larva and its habits are described in European works, but I desire to put on record in the Proceedings, for the benefit of American students, my own description of its habits.

* See *ante*, pp. 39 and 96. H. T. S.

† See *ante*, p. 96. H. T. S.

In early life the larva mines in a narrow, very serpentine track, sometimes intricately winding, and much resembling the mine of a *Nepticula* larva. It is perfectly transparent, with a central line of "frass," but in consequence of exposure to the weather, after its abandonment by the young larva, the delicate cuticles of the leaf are destroyed. When the young larva is about one line long, it appears to leave the linear mine, and thenceforward it mines the leaves in *blotches*, entering between the cuticles, from the under surface. These blotches are perfectly transparent, or glassy in appearance, when the leaf is held up to the light, and the larva, with its peculiarities of colouring, is seen with perfect distinctness. The point at which the larva raises the lower cuticle of the leaf is maintained open and the terminal rings of its body remain at this opening, or the larva retreats to it to void its "frass" externally. One leaf is often inhabited by several larvæ.

The lower surface of the leaf is occupied around the mined places by numerous cross-threads, woven by the larva and which resemble spider threads. These are freely traversed by the larvæ in moving from one part of the leaf to another.

In locomotion the movements of the larva are those of a half-looper.

The larva is slender, rather moniliform and somewhat flattened. The body is tuberculated along the sides of the segments with round nodules. The terminal prolegs project behind, like a little fork; the abdominal prolegs are very short and slender, and four in number; the pair on the 8th segment is rather larger than the others.

It is beautifully coloured. General hue greenish, varied with dark reddish, with six dark-reddish tubercles on each side. On each side the 5th segment is a pair of white tubercles, and two more pairs of the same hue on the 8th and 9th, and a single white one on each side of the 6th. Head pale brownish, as well as the second segment.

The pupa is naked, not inclosed in a cocoon, and is fixed by the tail at the junction of cross-threads on the under sur-

face of the leaf of the food plant, or other convenient neighbouring objects. The pupa is not suspended by the tail as in butterflies, but is supported on the cross-threads in a position more or less horizontal. The head case of the pupa is narrowly elongated and pointed, the process thus formed being three-sided. It tapers regularly from the thorax to the abdominal extremity, but on the back of the abdomen-case, which is somewhat flattened, there are three ridges, one in the middle, and one on each side. Colour blackish-brown; varied on the dorsum of the abdomen-case, with grayish along the edges of the ridges, and with greenish between them.

The first imago, taken in the pupa state on the 9th of October, appeared on the 21st instant. The imago rests in the position of a *Tischeria*, that is, with the fore-legs applied to the breast, the front part of the body elevated, and the ends of the wings touching the surface on which the imago may be standing. It is rather sluggish in its habits. The fall brood doubtless hybernates until the following spring.

The affinities of this little insect are very interesting. In early life its mode of mining indicates a relationship to the genus *Nepticula*. Its subsequent habits recall those of the genera *Tischeria* and *Butalis*.

The larva resembles the false loopers of the *Noctuina*, and its mode of transformation closely approaches the pupation of the Rhopalocerous larvæ, the *Pterophorina*, and that of the genus *Elachista*. In the imago the folded fore-legs, the position at rest and the tufted front, show strong affinities towards the genus *Tischeria*, and its wing structure places it in the Lithocolletiform group of the *Tineina*, to which the former genus belongs.

The collector in searching for the larvæ of this insect, should look amongst the leaves that are most shaded, for these are preferred to those exposed to the sun. After having found a plant inhabited by them, he can either secure them and rear them in breeding-vessels, or wait until the period of pupation, and secure the pupæ without the trouble of attending to the feeding of the larvæ.

Nepticula Miners of the Sycamore Leaf.

I ascertained during the fall of 1861, that there is more than one species of *Nepticula* that mines the leaves of the sycamore tree, and that all of them are double-brooded. The first brood may be taken early in June and July, and the second during the latter part of September and early in October.

The mine and larva of one species is described in the November and December number of the present work for 1861, page 83,* and the imago in the January and February number for 1862, page 133;† but it may be well to repeat here, for the purpose of comparison, a more circumstantial description of the mine of the species to which allusion is made.

The mine of *Nepticula Platanella* begins as a very slender track, *the entire length of which is filled with frass.* This is very soon expanded into a round, conspicuous, blister-like blotch, on the upper surface of the leaves, which sometimes obliterates the early portion of the mine; but in this event it is still perceptible on the separated epidermis as a slender, dark-brown line. After the blotch has been formed, the "frass" is diffused over the floor of the mine, discolouring its surface.

Sycamore miner, No. 2, mines in quite a straight line, when its course is along a vein of the leaf, otherwise it is slightly winding. The mine begins as an extremely minute tract, and is gradually enlarged towards the extremity. A day or two before leaving its mine the larva *enlarges the end into a small blotch*, which has attached to it a long linear track, *with a central line of blackish frass.* In the enlarged portion of the mine the frass-line changes into one of scattered and separated grains.

The larva is of a lively or bright-green colour, with a dark-green central line of intestinal matters. Head pale brownish.

* See *ante*, p. 173. H. T. S.

† See *ante*, p. 183. H. T. S.

The body tapers somewhat from the thoracic rings. The larva was not taken from the mine for description.

The imago of this species is undescribed, and although I secured cocoonets last fall, which may produce imagos in the spring, I shall be glad if some new observer rears imagos in the coming summer and records a description of them.

Sycamore miner, No. 3, mines, at first, in a very narrow, transparent track, *having a blackish central line of frass;* the tract being usually much contorted. At this stage of its larval life, which is its earliest period, the miner can scarcely be detected by the naked eye. Three or four days before pupation, the larva begins to enlarge the linear mine into a blotch. This enlargement takes place most often over the course of the old linear mine, *the latter half of which furnishes the basis of the blotch*, and hence leaves within it a blackish frass-line. The edges of the blotch are irregular; in the mine of *Platanella* the blotch is circular or nearly so, and the early portion of the mine is filled with frass, while the blotch is formed by dilating the linear tract, after it becomes five or six lines long.

The larva, when young, is transparent; colour white, tinged with greenish, with the thoracic segments swollen, giving it a fusiform appearance. Subsequently it becomes of a pale-green colour, retaining, however, the swollen thoracic rings.

In order to insure success in rearing these larvæ, one must be careful that an excess of moisture does not condense on the sides of the vessels in which the leaves containing them are kept. When the larvæ are full fed, they abandon their mines in order to weave their cocoons, and if there is much moisture on the sides of the vessel, the larvæ will be drowned in it as they endeavour to ascend its sides. When this happens, or when the larvæ are disabled by a few hours' submersion in this moisture, the observer is not only discouraged, but his care and attention are lost.

This accident has happened to me very often. In order to avoid it I have found that if the layer of moist sand is

covered with a layer of damp earth an inch or two thick, and packed rather firmly, that the moisture does not collect on the sides of the vessel to such a degree as to endanger the lives of the larvæ. Indeed its accumulation may be prevented entirely, provided the sand is not too wet. The earth should not be wetted and its degree of dampness should be that which is natural to the soil in summer. If the cover of the breeding-vessel fits accurately, the leaves may be laid simply on the surface of the earth, and they will keep fresh for quite a long time.

The cocoonets are not as easily detected by the eye, however, on the brown earth, as they are on the surface of white sand. But if the surface of the earth is smoothed with the fingers, so as to leave no fissures or cracks in it, the larvæ will nearly always weave on the sides of the glass where they meet the surface of the earth.

The sycamore miners often weave their cocoonets within their mines, when the air within the vessel is too humid. Previously to weaving they carefully cut the epidermis, some distance on each side of the point at which the cocoonet is to be placed, and thus secure their exit as imagos. According to my observation, this never takes place in nature. And yet, great numbers of the larvæ that mine leaves overhanging a stream of water—for the sycamore usually stands along the margins of streams—must be drowned after abandoning their mines.

[Extracted from the Proceedings of the Entomological Society of Philadelphia, Vol. I. pp. 173—181, March, 1862.]

SYNOPSIS OF FAMILIES OF HETEROCERA.

BY BRACKENRIDGE CLEMENS, M.D.

That the following Synopsis of Families may be used to advantage, it is necessary that the fore and hind-wings should be carefully denuded of their scales on both sides.

My own method of doing this, is as follows: the wings are carefully detached from the thorax and placed on a slip of glass, with the surface a little moistened with common water. Then with a *sable hair-pencil*, pointed and moistened by the lips, the upper surface is denuded, working with light and careful touches, in the direction in which the scales lie. When the upper surface has been denuded and the wings have dried, they can be easily detached from the glass by placing the point of the pencil under the base, or the part attached to the thorax. After the wings have been detached from the glass the denuded side is secured to it by a little moisture from the mouth, as it is slightly adhesive when dried, and the under side is then carefully denuded.

The entire surface of the wing need not be denuded; it is quite sufficient if those parts in which the modifications of structure chiefly take place are made transparent. This, however, applies principally to the fore-wings; it is necessary to obtain a clear view of every portion of the hind-wings, except the distribution of the nervules to the hinder margin.

When the wings are very small, they must be denuded under a lens. When large, the under side can be denuded without removal from the body.

The wings thus treated should be permitted to remain on the glass slide after the under side has been deprived of their scales, and protected from injury by a thin piece of mica, or thin glass cemented to the surface by common paste or some of the cements used for making microscopic preparations. The slides may be an inch wide and two inches long, and may contain one or more specimens. In order that they may be easily distinguished, the slides should be covered with paper, leaving openings through which the wings can be seen, and the names of the family, genus and species written upon it.

The following is the method used by M. Guenée, which the student may prefer: "I commence by depriving the wing, on both sides, of nearly all its scales, by means of the solution of gum that is used to take impressions of them [between two pieces of paper or tissue-paper, which are moistened with the solution of gum, I suppose, and submitted to light pressure]; and as some scales are not taken off by this treatment, especially those which cover the subcostal vein of the fore-wings, I submit it several times to a separate impression, and I finish by brushing away, with the point of a pencil, all the scales that remain on it. Afterwards I place the wings, still wet, between two perfectly equal slips of glass, and secure them with a little wooden vice [the clothes-pin which opens and closes by means of a spiral spring answers a very good purpose for this use], and bind around the slips a little band of black paper, which I turn over slightly on each end. When all is dry I remove the compressor, and obtain thus a very transparent frame, on the side of which I write the name of the species, and which presents, for study, the greatest convenience."

In order to save space, the contraction "F. w." will be used for *Fore-wings;* and unless the fore-wings are specified, the categories must always be understood to refer to the hind-wings.

The "secondary cell" is formed within the disk of the fore-wings by a branch from the subcostal vein; it will sometimes be contracted into "*2ndy cell.*"

The "areole" is a cell formed by the branches of the subcostal vein of the fore-wings.

The "disco-central" nervule is one that rises from the middle of the disk; when on the side of the median vein, it will be called "medio-discal." To save space, the former will sometimes be simply "the disco-central."

The "intercostal cell" is formed in the hind-wings by a junction between the costal and subcostal veins or a minute communicating vein, when the two are parallel in their course, called the intercostal.

For all particulars respecting the names of the veins, &c., the student is referred to a paper on the North American Sphinges, contained in the Journ. Acad. Nat. Sci., July, 1859, where the subject is illustrated by figures.

I regret that I have neither the material nor the time to enable me to give a synopsis of the genera of each of the families. The plan here adopted is perfectly applicable to this purpose; but it is scarcely the work of one who has a limited collection, and by no means an extended acquaintance with genera. For much of the information contained in the various categories, I have been dependent on various authors, so that I fear that now and then a family group may be misplaced under a general heading not applicable to it, or some detail of structure may not be correct. This I am sure the student will overlook, when he considers that this is the first attempt that has been made to arrange analytically the numerous families of the great group *Heterocera*.

It may be advisable, perhaps, to indicate the mode of using the following table, in order to ascertain the family to which an insect may belong, that one wishes to classify, or to ascertain whether it has been described.

It will be noticed that for each *affirmative category* there is a corresponding *negative category*, and, as far as my knowledge extends, each of them is absolute. Thus, the first includes all Heterocerous Lepidoptera whose "wings are not penniform or fissured," and an insect corresponding to this will be found in its family group some place under this head-

ing. If, on the contrary, the wings of the insect are fissured, it will be found under the second principal category, printed in the same kind of type† as the first, viz.: those whose "wings are penniform or fissured."

If the specimen belongs to the first category, the student will notice whether the hind-wings are supplied with a "bristle," or not; if it is absent, the specimen belongs to a family included under the second category. He will then observe whether the wing structure in both the fore and hind-wings is alike; if it is, and the specific diagnosis below this category corresponds to his specimen, it belongs to the family *Epialidæ.*

If the wing structure is not alike in the fore and hind-wings of the specimen, then its family must be sought under the category marked**. If this has not a "costal vein" in the hind-wings, it is included in the division marked §; but if it has a "costal vein," then under the next affirmative category referring to the same structure. This latter category is again subdivided into two others, insects "*With an intercostal cell*" and "*Without an intercostal cell,*" and the latter is again subdivided into groups according to the peculiarities of the "*internal vein.*"

The specimen, however, probably is supplied with a "bristle" at the base of the costa of the hind-wings, and in this case the student will pass, without further examination of the categories included in the second one, to the corresponding affirmative category, printed in the same kind of type† as the second, viz.: insects "with a bristle at the base of the hind-wings."

If the wings are "without long cilia," the specimen will be found under the next head; but if, on the contrary, the wings have "long cilia," all the matter included under the negative category may be passed over until the corresponding

† In the original, Dr. Clemens has endeavoured to introduce a great variety of types, so as really to carry out this idea, but this, in reprinting, I have found impracticable. H. T. S.

affirmative one is reached, under which will be found the family to which the specimen belongs.

To assist the student in discovering the various affirmative and negative categories, those which have reference to the same structural peculiarities are printed in some distinctive type,† and the different categories separated by spaces. He should confine himself to these, until some one is found that corresponds to his specimen, and then continue the investigation by examining the various subdivisions under it, until one is found that is again descriptive of his specimen, and at last the special description indicating the family. Whenever the category disagrees with his specimen, he should, therefore, pass on to the next one in the same kind of type† until one is found that does agree with it.

Each category includes everything between it and the next of the same value, so that it is useless to look under a disagreeing head for anything that characterizes the specimen whose structure does not correspond to it.

The student must be careful, in detaching the wings from the thorax of a moth, that the little "bristle," which attaches the hind-wings to the anterior pair, is not broken.

Heterocera.

Antennæ setaceous or fusiform, with the apex attenuated (except *Castnia*, which, however, has a collar to the prothorax and the posterior wings a bristle): *wings usually flat in repose; hind-wings generally furnished with a bristle; prothorax covered by a collar or patagium.* Very often with ocelli or false eyes on the head behind the antennæ. Flight diurnal, crepuscular, most frequently nocturnal.

WINGS NOT PENNIFORM OR FISSURED.

HIND-WINGS WITHOUT A BRISTLE AT THE BASE OF THE COSTA.

* Neuration alike in the fore and hind-wings.

Costal vein long; a basal spur at base; subcostal 4-branched, apical furcate.

Wings long, narrow; discal 3-branched. Median 2-branched. Antennæ very short. **Epialidæ.**

† See note on previous page. H. T. S.

* * Neuration not alike in fore and hind-wings.

§ Without a costal vein.

Subcostal vein bifid; with disco-central nervule; median 4-branched. Bombycidæ (*Oylothrix*).

§ With a costal vein.

† With a more or less distinct intercostal cell.

Costal vein short; subcostal 3 or 4-branched.

Cell nearly circular, more or less distinct; discal branchless; median 4-branched. Bombycidæ.

Costal rather long; subcostal bifid, attenuated.

Cell long, narrow; discal fold decided; median 4-branched. F. w. fold thickened. Cossidæ.

† † Without an intercostal cell.

‡ *With a long internal vein extended to anal angle.*

Costal long, free, simple. Subcostal 3-branched.

Disk usually open; if closed without disco-central.

F. w. with the subcosto-inferior nervule furcate. Saturnidæ.

F. w. with the subcosto-inferior nervule simple. Ceratocampidæ.

‡ ‡ *With a short internal vein, near inner margin.*

Costal and subcostal veins parallel towards the base.

Subcostal divides interior to the discal vein.

Discal angulated, simple, arising from subcosto-post apical.

Antennæ pectinated or filiform. Palpi very short. Tongue almost obsolete. Wings often falcate. * Drepanulidæ.

‡ ‡ ‡ *Without an internal vein. Subcostal bifid.*

Median trifid. Discal nervule arises from subcostal.

F. w. costal vein bifid. H. w. tailed. Imagos papilionaceous. Uranidæ.

HIND-WINGS WITH A BRISTLE AT THE BASE.

WINGS WITHOUT LONG CILIA, NOT POINTED.

HIND-WINGS WITHOUT A COSTAL VEIN.

Submedian and internal veins distinct, long.

* Median vein 4-branched.

Hind-wings, costa dilated at the base.

Subcostal curved, 3-branched, with an imperfect basal cell.

* Characters drawn from *Platypteryx* (*Drepana*) *lacertinaria* of Europe.

F. w. subcostal exterior to the disk 4-branched; fold thickened; submedian doubly furcate. Bombycidæ (Gen. *Pimela*).

Hind-wings, costa not dilated at the base.

Subcostal bifid. Lower branch not decidedly angulated. Without disco-central. Antennæ incrassated at the tip, shortly pectinate. Zygænidæ.

Antennæ setaceous, pectinate; body often metallic.

Subcostal bifid. Lower branch decidedly angulated. With disco-central, antennæ pectinate; wings slightly diaphanous. Ctenuchidæ.

* * Median vein 3-branched.

† Subcostal trifid. With a disco-central nervule. Antennæ setiform; wings semi-diaphanous. (*Nudaria*? C.) Lithosidæ.

‡ Without disco-central nervule.

Wings with marginal gemmated spots. (A remarkable exception.) Pyralidæ.

F. w. with a broad stripe; f. w. neuration sphingiform (*Ormetica*, C.) Glaucopididæ.

† † Subcostal bifid. Without disco-central.

Antennæ minutely pectinated; f. w. subcostal branches separated. Lycomorphidæ.

‡ ‡ With a disco-central nervule.

Antennæ deeply pectinate; wings limpid; ♀ apterous. F. w. submedian with branches. Psychidæ.

Antennæ shortly pectinate; body metallic. F. w. neuration sphingiform. Glaucopididæ.

* * * Median bifid, lower branch furcate at tip.

† Subcostal bifid. With disco-central nervule. Antennæ pectinate; wings often limpid or with limpid spots. Glaucopididæ.

Submedian distinct, internal obsolete.

† Median vein 2-branched. *The females of the genus Dineurodes.*

† † Median vein 3 or 4-branched.

Subcostal trifid, furcate at base;* discal vein with or without nervule.

* Properly considered, the costal and subcostal are partly soldered together, but the formation might be mistaken for a trifid vein by a novice.

F. w. with one or more areoles. Wings thin. Body slender. Geometridæ.

Submedian and internal veins obsolete.

Subcostal and median 3-branched; with disco-central. *Sexual peculiarity among ♀ of Eubolides.* Geometridæ.

HIND WINGS WITH A COSTAL VEIN.

§ 1. *With an intercostal cell.*

† With an internal vein.

Median 3 or 4-branched. Subcostal bifid.

Lower branch of subcostal angulated; costal furcate at base.

Antennæ fusiform. F. w. with nervules radiating from the disk. Zygænidæ.

Lower branch not angulated; costal simple at base.

Antennæ fusiform, setigerous, sometimes ciliated. F. w. with subcostal nervules aggregated. Sphingidæ.

† † Without an internal vein.

Median vein 3-branched.

Subcostal simple; discal vein with angle pointing outward, with a nervule.

Subcostal bifid, discal vein curved, with disco-central.

Wings thin, delicate; h. w. angulated at apical nervule. F. w. with two areoles. Geometridæ.

§ 2. *Without an intercostal cell.*

¶ Hind-wings without an internal vein.

Hind-wings with a tail-like appendage.

Median 3-branched. Subcostal bifid.

Disk closed, with disco-central. F. w. with costal vein simple; subcosto-inferior simple. Sematuridæ.

Hind-wings without tail-like appendage.

Median 3-branched. Subcostal bifid. Costal and subcostal pendiculate.

Body slender. Wings thin. F. w. often with an areole. Geometridæ.

¶ ¶ Internal vein never very short or nearly coincident with the inner margin.

Antennæ thickened or incrassated towards the tip.

Wings with transparent spots. Abdomen tufted at the tip. Thyridæ.

Subcostal bifid. Median trifid. With disco-central.

F. w. submedian with an internal branch; subc. inferior furcate. Antennæ clavate. Castniadæ.

F. w. submedian simple; subc. inferior simple. Antennæ thickened towards tips. Agaristidæ.

Subcostal simple. Median trifid, upper branches pedicellate. With disco-central.

Wings often hyaline. F. w. with radiating nervules; costa folded. Antennæ fusiform. Ægeriadæ.

Antennæ never thickened or incrassated toward the tip.

§ 1. F. W. WITH NERVULES RADIATING FROM THE DISK.

Hind-wings, costal vein simple.

Subcostal simple, attenuated towards base; discal nervules, two.

F. w. spotted; medio-posterior remote; secondary cell very distinct. Gen. *Pœciloptera*, Clem.

F. w. not spotted; medio-posterior not remote; secondary cell indistinct. Gen. *Anaphora*, Clem. Tineidæ.

Subcostal simple, slightly joined to costal and curved into the discal.

Median 3-branched; discal vein simple.

F. w. with *seven* nervules to the costa and hind margin.* (*E. Zeæ.*) Pyralidæ.

Subcostal bifid, not attenuated; branches usually connivent.

Median 4-branched; without disco-central.

F. w. costa at base often arched; median nervules curved. Subcostal remote. Tortricidæ.

§ 2. F. W. WITH NERVULES NOT RADIATING FROM THE DISK.

1°. F. w. with the fold thickened by a slender vein.

Costal vein simple, crossing subcostal or pedicellate.

Subcostal bifid. Discal irregular, with medio-discal branch.

* This wing-structure is a remarkable exception in the family. B. C.

Median 3-branched. Tongue extremely short or absent. Body short, thick. Limacodidæ.

2°. F. w. with the fold not thickened.

* Median 3 or 4-branched. Costal simple.

† Subcostal bifid, attenuated towards the base from the discal.

With maxillary palpi. Antennæ, basal joint often with appendages. Pyralidæ.

† † Subcostal bifid, not attenuated; parallel to or in contact with costal.

Head without ocelli. Tongue nearly obsolete or short.

‡ *Subcostal divides exterior to the discal vein.*

Costal arched at base, touching subcostal slightly.

Disco-central wanting. Antennæ generally pectinate. Abdomen tufted at the end. Liparidæ.

Costal parallel to or in contact with subcostal toward the base.

With disco-central. Antennæ shortly pectinate or ciliate. Body thick. Legs hairy. Notodontidæ.

Costal and subcostal with a common stalk.

Median 3-branched. Discal simple or with medio-discal. F. w. subcostal remote. Lithosidæ.

Median 3-branched. Disco-central feeble, lost in the fold. Head small, sunken (*Glottulides*). Noctuidæ.

‡ ‡ *Subcostal divides interior to the discal vein.*

Costal and subcostal vein parallel.

With medio-discal. Antennæ simple, pubescent. Body rather thick. Legs hairy.

Noctuidæ *pars.* (Noctuo-Bombycides.)

Head with ocelli. Tongue short or almost obsolete.

‡ *Subcostal divides exterior to the disk.*

Costal and subcostal parallel or touching at the base.

With disco-central. Antennæ simple or ciliated. Legs and abdomen with tufts. Notodontidæ *pars.*

Costal and subcostal veins with a common stalk.

Antennæ bipectinate, ciliate, serrate or simple.

Labial palpi small, pilose, scarcely exceeding the clypeus.
Medio-posterior nervule remote from medio-inferior.

Median 4-branched. Discal vein angulated, simple. Abdomen, most often spotted. **Arctiidæ.**

Median 3-branched; discal angulated, simple. F. w. apical vein trifid at tip. Gen. *Crocota.*

Head with ocelli. Tongue moderately long.

‡ *Subcostal divides exterior to the disk.*

Costal and subcostal pedicellate or decussating at base.
Labial palpi ascending, stout; last joint closely scaled, slenderer than the middle.
Median 3-branched, with medio-discal or disco-central.

F. w. always with an areole, sometimes two. Wings deflexed. **Noctuidæ.**

* * MEDIAN 4-BRANCHED. COSTAL VEIN BIFID.

Subcostal simple, attenuated or obsolete, from a minute intercostal.

Discal with a long curve. Head with maxillary palpi. **Pyralidæ.**

¶ ¶ ¶ Hind-wings with an internal vein, very short, or almost obsolete.

Internal vein nearly coincident with the inner margin.

Costal and subcostal pedicellate, parallel, or in contact towards the base.
Subcostal bifid; median trifid; with or without disco-central.

Wings thin, often elevated in repose. F. w. often with an areole. **Geometridæ.**

WINGS WITH LONG CILIA, POINTED. IMAGO SMALL.

NEURATION SIMILAR IN FORE AND HIND-WINGS.

Costal veins bifid or simple.

Subcostal with 2ndy cell. F. w. with an intercostal branch between a branch of the costal and the first of subcostal; second branch furcate, with four branches from the end of the disk. An intermediate branch between the bifid medio-posterior and the median vein. **Micropterigidæ.**

Subcostal without 2ndy cell. In both wings, three subcosto-marginal nervules, the apical bifid; medio-posterior from near the base, connected with the median or a branch of it by a transverse branch. Micropterigidæ.

NEURATION DISSIMILAR IN FORE AND HIND-WINGS.

Hind-wings rather broad; very often ovate-lanceolate, never linear-lanceolate.

Median 2-branched; discal nervules 2 or 3. Subcostal bifid or simple. Group *Tineides.*
Median 3-branched; discal nervules 2, 1, or none. Subcostal bifid or simple.
Costa often excised; very often the upper median nervules pedicellate. Group *Gelechides.*
} Tineidæ.

Hind-wings extremely narrow, linear-lanceolate or almost setiform.

Median vein 2 or 3-branched. Subcostal simple or bifid.

Disk most often unclosed; with a simple or furcate nervule, free, or arising from the subcostal. Group *Gracilarides.*
Median vein simple. Subcostal central, 2, 3 or 4-branched.
Disk always unclosed. Costal vein obsolete. Group *Lithocolletides.*
} Gracilaridæ.

WINGS PENNIFORM OR FISSURED.

Fore-wings fissured, hind-wings entire.

Sometimes amongst the *Deltoididæ.*

Both wings fissured.

Fore-wings bifid, hind-wings trifid. Pterophoridæ.
Fore and hind-wings divided into six. Alucitidæ.

[Extracted from the Proceedings of the Entomological Society of Philadelphia, Vol. II., pp. 4—14, March, 1863.]

AMERICAN MICRO-LEPIDOPTERA.

BY BRACKENRIDGE CLEMENS, M.D.

TINEINA.

STROBISIA, Clemens.*

Proc. Acad. Nat. Sci., May, 1860, p. 164.

82 *S. levipedella.* Fore-wings dark brownish, with a cupreous hue. The apical half of the wing is darker than the basal half. About the middle of the costa is a short oblique white streak, and another of the same hue midway between it and the tip of the wing, perpendicular to the costa, and of nearly triangular form. Beneath the first costal streak are two short, longitudinal dashes, one on each side of the fold of the wing, and two others of the same hue, parallel, and beneath the second costal streak. Cilia with a violet iridescence. Hind-wings dark brownish.

Antennæ dark brownish. Head whitish beneath. Labial palpi white, third joint dark brownish exteriorly. Feet annulated with white.

When it alights after a flight, *it walks in a wavy line and turns round several times in a circle.*

I have a single specimen, taken on wing the 1st of June.

PARECTOPA, Clemens.†

Proc. Acad. Nat. Sci., June, 1860, p. 209.

83 *P. Robiniella.* Fore-wings fine brown, somewhat golden, shaded with dark brown. Along the costa are *three oblique*

* See *ante*, p. 117. H. T. S.

† See *ante*, p. 144. H. T. S.

silvery streaks, the one nearest the base of the wing short, and the other extended to the middle of the wing, each shaded along their margins with dark brown. On the inner margin are three silvery dorsal spots, placed opposite the spaces between the costal streaks. Near the tip of the wing *is a transverse, narrow, curved silvery line*, passing from the costa to the inner angle. At the base of the cilia are two black converging lines, which do not meet opposite the apex of the wing. Cilia silvery-white, tipped with dark fuscous. Hind-wings dark brown; cilia the same.

Antennæ dark brown, very slightly annulated with whitish, and the extreme tip silvery-white. Head dark brown, tuft and face silvery-white. Labial palpi dark fuscous, the third joint silvery-white. Feet annulated with white.

The larva mines the leaf of the locust, making a blotch mine on the *upper surface* of the leaf, with a number of lateral galleries running out from it, on each side. Its habits in all respects are similar to those of *P. lespedezæfoliella*. I am unable to indicate exactly the month in which it should be sought, as I have mislaid the notes made on this species; but I think it can be found in the latter part of spring. I have always found the mines untenanted at the time the leaf is mined by *Lithocolletis Robiniella*.

In the Fifth Annual Report of New York State Agricultural Society, Dr. Fitch describes two locust leaf-miners. The first, *Anacampsis Robiniella*, is unquestionably a *Lithocolletis*. If Dr. Fitch has been led into no error, it is a new species, and the specific name must be changed. The other species, *Argyromiges Pseudacaciella*, is identical with *Lithocolletis Robiniella*,* Proc. Acad. Nat. Sci., November, 1859, p. 319, first described by myself a year or two previously in the Entomologist,† published in London, by W. H. Stainton (*sic*). *P. Robiniella* and *L. Robiniella* are the only miners

* See *ante*, p. 66. H. T. S.

† This allusion is to the Entomologist's Weekly Intelligencer, vol. 3, p. 125, where some extracts from the letter of December 12th, 1857 (see *ante*, p. 8), were inserted. H. T. S.

I have found in the leaf of the locust, although I have examined the leaves yearly for several years in succession. And I will candidly say, that I do not think there can be two species of *Lithocolletis*, that mine the leaves of the locust, for Dr. Fitch's history of *Anacampsis Robiniella* is contradictory and at variance with the natural history of the genus. His description of larva shows that it belongs to the second larval group * (see Proc. Acad. Nat. Sci., November, 1859, p. 318), the mines of which are invariably *flat and situated on the upper surface of the leaf;* but according to his description the mine is on the *under surface and tent-like.* The flattened *Lithocolletis* larvæ cannot make a mine similar to that of the cylindrical larvæ, in consequence of the different formation of their heads. In all probability Dr. Fitch has been led into error respecting the insect he has named *Anacampsis Robiniella,* and I am unable to recognize, in his description of the imago, any of the species of *Lithocolletis* known to me.

Brenthia, Clemens. †

Proc. Acad. Nat. Sci., May, 1860, p. 172.

The second joint of the labial palpi almost tufted.

B. inflatella. Fore-wings dull orange; in the middle of the wing dark fuscous, dusted with white. At the base of the wing are three or four small spots of a beautiful metallic green, and two others of the same hue on the disk, between which, on the costa, is a small white spot. At the apical third of the wing is a curved metallic green band, extending from the costa to the inner angle, beginning on the costa in a small white spot. A little beyond the metallic line, towards the base of the wing, on the inner margin, is a small spot of the same metallic hue. Near the hinder margin is a subterminal dark-fuscous line, which from the costa to the middle of the wing is overlaid with metallic-green scales, and on the costa, between the two transverse lines, is a white spot. Cilia fus-

* See *ante*, p. 63. H. T. S.

† See *ante*, p. 133. H. T. S.

cous, white in the middle of the wing. Hind-wings dull fuscous, with two iridescent spots near the inner angle. Abdomen with two iridescent spots near the tip.

Antennæ fuscous, annulated with white. Head and labial palpi gray, varied with fuscous. Feet dark fuscous, annulated with white.

I have before me a single specimen, taken on the wing in July.

Coleophora, Zeller.*

Proc. Acad. Nat. Sci., Jan. 1860, p. 4.

Wings with long cilia. Hind-wings very narrow, lanceolate. The subcostal vein is attenuated towards the base of the wing, and near the middle of the wing divides into two branches. The median vein runs near the inner margin of the wing, and divides into two short branches. The discoidal vein, often indistinct, is simple and free.

The fore-wings are lanceolate, often nearly caudulate. The discoidal cell is closed, long and narrow. The subcostal vein is rather remote from the costa and throws off from the cell three branches to the exterior margin, and two to the tip of the wing from the exterior end of the cell, sometimes a furcate branch. The median vein gives off two very short branches from its extreme end to the inner margin behind the tip. The submedian has a long fork at its base.

Head above and in front smooth. No ocelli. *Antennæ sometimes thickened with scales to the middle*, generally slender, simple, basal joint elongated, frequently with a tuft of hair. Labial palpi slender, rather porrected, with a slender prolonged tuft from the second joint, the third joint pointed. Tongue scaled, about as long as the anterior coxæ or a little longer.

The larva is a case bearer, changing to a pupa *within the case.*

* See *ante*, p. 88. H. T. S.

Antennal stalk simple, basal joint tufted.

C. leucochrysella. Fore-wings immaculate white, slightly tinted with yellowish at the extreme apex. Cilia yellowish-white. Hind-wings dark fuscous, cilia the same. Antennæ annulated with black and white. Head and labial palpi white. Feet annulated with white and brownish.

Taken on wing in the latter part of July.

Antennal stalk simple, basal joint not tufted.

C. concolorella. The entire insect is of a uniform, rather dark yellow-ochreous colour.

Taken on wing 13th of June. A single specimen.

I have other species belonging to this genus, but as they are not in perfect condition I forbear to describe them.

MARMARA, new gen.

Hind wings setiform. The subcostal vein is faint, attenuated and simple. The discal vein free, central and two-branched. The median vein simple.

Fore-wings narrowly lanceolate. The disk long, narrow and closed. The subcostal vein is well defined from the base to the first marginal branch, which appears to be a continuation of it. But from the origin of the first marginal branch, the vein is greatly attenuated and is deflected towards the middle of the wing, and subdivides into two branches opposite the point at which the first marginal branch attains the costa. The two branches into which the subcostal divides are delivered one to the costa just behind the tip and the other midway between this and the costal end of the first marginal branch. The median vein is two-branched and is well defined from the base to its branches, all of which are attenuated. The posterior branch is short, and the next is delivered to the tip of the wing and receives an oblique discal vein from the last branch of the subcostal, which closes the disk. The submedian vein is simple.

Head smooth, with appressed scales. Ocelli ——? An-

tennæ one-third less long than the fore-wings. Labial palpi slender, ascending, not higher than the vertex; the second joint is scaly, the third smooth. Beneath the labial palpi are small, ascending maxillary palpi. Tongue naked, as long as the fore coxæ and femora.

The larva is much flattened, and the segments separated by deep incisions, particularly on the sides. The head is extremely thin, circular, with a peculiar appendage in front of the mandibles similar to that found in the larva of *Lithocolletis* of the *second group*,* which it likewise resembles in form. Like these it has three feet and *three abdominal prolegs* and one terminal pair, all very short. It leaves its mine at maturity to weave a white, semi-transparent cocoon within some crevice of the bark of the tree on which it feeds or upon the ground. The exterior of the cocoon is covered with little froth-like globules, which resemble minute pearls.

The imago rests with the front part of the body elevated, and, I believe, the fore-feet applied to the breast, like the members of the genus *Tischeria*. The antennæ are held extended at the side of the head, and have a constant trembling motion.

125 *M. salictella*. Fore-wings dark fuscous, with a silvery-white band at the basal third of the wing, and a slightly oblique one of the same hue, in the middle inclined towards the inner angle. Near the tip of the wing is a dorsal and costal silvery-white spot opposite each other. Behind the dorsal spot, is a narrow, somewhat curved white streak, extending from the apical cilia to the middle of the wing. Cilia silvery-grayish at the tips. Hind-wings grayish-fuscous.

Antennæ grayish-fuscous. Head silvery-white. Labial palpi silvery; the hairs of the second joint touched with fuscous. Maxillary palpi dark fuscous.

The larva mines the young branches of the yellow willow tree. I have always found it in those that spring from the

* See *ante*, p. 63. H. T. S.

trunk. Its mine is extremely long and very narrow, being only a tract beneath the young and delicate cuticle of the branches, sufficiently wide to accommodate the body of the miner. At first it is difficult to detect the mine, but after some months it is easily traced by the elevated line of reddish-brown matter that marks the course of it. Thus it is easily found in early spring before the buds have expanded, and the larva may be sought in April and is easily reared. In the spring the larva is of a dark lemon-yellow colour without markings, and at this time the larva can be seen through the cuticle of the branch. About the middle of May, or rather about the 10th of the month, the larva will be found banded alternately with red and yellow, with two black dorsal dashes on the *second segment*. (I regard the head as the first.) This is the indication that it has reached its maturity, and in a day or two it cuts the cuticle and leaves the mine to weave its cocoon, sometimes in the angle of a bud, on the branch of which it has been feeding, and sometimes on adjacent substances.

In rearing this insect, it is simply necessary to thrust the branches of the willow into wet sand contained in some convenient vessel, and to protect them so that the larvæ cannot wander after leaving their mines.

The perfect insect appears after a pupation of about a month, or, as in the case of one specimen specially observed, in twenty-six days. It may be found as an imago, therefore, about the middle of June.

Glyphipteryx, Hübner.

Wings oblong or elongate, with moderately long cilia. Hind-wings rather ovate or lanceolate. The costal vein is conspicuous, free and simple. The subcostal simple, attenuated towards the base. The discal vein gives rise to two discal nervules. The median subdivides into three branches, the upper two arising from a common base.

In the anterior wings the secondary cell is distinct and the

subcostal vein divides into four branches, the first arising behind the secondary cell and three from its hinder end, the last of which is delivered to the tip of the wing. Beneath these are three nervules thrown off from the middle of the disk. The median is 3-branched, giving off the nervules somewhat aggregated.

Head smooth. Forehead broad. Ocelli large. Antennæ slender, short, not one-half as long as the fore-wings, with distinct joints. Labial palpi arched, reaching about the middle of the front (but in the dried specimen decumbent or porrected), cylindrical, slightly hirsute; terminal joint pointed, as long as the second. Tongue naked, of moderate length.

Ce'typha 178 *G. impigritella.* Fore-wings dark bronzy-brown, with a conspicuous, curved, silvery-white streak, arising from the basal third of the inner margin, where it is widest and curving to the middle of the wing, *and dark-margined on both sides.* On the costa are five short, silvery-white streaks, the first oblique, the others nearly perpendicular, all of which are *black-margined internally;* the lines which form these margins are more or less distinctly extended across the wing. That of the first and second costal streaks meet just above the end of the conspicuous dorsal streak from the inner margin. Between the costal streaks, the wing is slightly touched with golden-brown. Opposite the first and second costal streaks is a small white spot on the inner margin, the curved black marginal line of the second costal streak touching its inner side. At the tip of the wing is a conspicuous round black spot, and beneath it, in the cilia, is a silvery-gray hook, and the cilia of the extreme tip is slightly touched with a silvery hue. Hind-wings and cilia of the same hue as the fore-wings.

Antennæ and head dark bronzy-brown. Labial palpi whitish, with fuscous exteriorly. Feet annulated with white.

Taken on wing in July.

This insect is very like *G. equitella* of Europe. The darker colour of our species, the dark-margined silvery

streaks and the absence of silvery-violet spots, are the chief differences. The European species burrows in the shoots of *Sedum acre* (Stone-crop or Wild Orpine), and probably our species may be found in the same plant or another of the genus *Sedum*.

Gracilaria, Zeller.*

Proc. Acad. Nat. Sci., Jan. 1860, p. 6.

Wings with long cilia. Hind-wings narrowly lanceolate; the costa is concave or excised in the middle. The costal vein is short, entering the costa at the beginning of the concavity. The subcostal vein is simple and runs near the costa, and is much attenuated posteriorly. *The discal vein runs through the middle of the unclosed cell, arises at the base of the wing much attenuated, and is connected by an inosculating, minute branch with the subcostal vein about the middle of the wing, and becomes furcate at its extremity.* The median vein is placed near the inner margin and is 3-branched.

Fore-wings lanceolate. The discal cell is long and narrow, and the subcostal vein is attenuated towards the base, and gives off a single, rather long, marginal branch, quite near the base of the wing. From the hinder portion of the discal cell nine nervules are given off, four of which go to the costa, and five to the hinder margin. The submedian vein is simple.

Head and face smooth. Without ocelli. Antennæ filiform, as long as the fore-wings. Labial palpi slender, ascending, cylindrical; the second joint with appressed scales, *not tufted;* the terminal joint pointed. Maxillary palpi rather long, filiform. Tongue clothed with scales.

In the small species of this genus, the maxillary palpi are less developed, and the labial palpi are almost drooping. In the dried specimen the labial palpi are almost always more or less drooping.

* See *ante*, p. 91. H. T. S.

The species of this genus are elegant in form and often gaily coloured or prettily mottled. The position of the imago at rest is extremely characteristic, but not peculiar to it. The front of the body is elevated by the fore-legs being held vertically, so that the tips of the wings touch the surface on which the insect rests. The imago appears to be about to poise itself on its wing-tips, or to have raised its head into a position of profound attention. The larvæ have only fourteen feet; when young they mine the leaves, but at a later period of growth many of the species construct cones, by rolling up a portion of the leaf. They devour the inner portion of the cone, which thus becomes discoloured and easily observed.

The description of the species below was made originally from a poor specimen,* and I therefore take this opportunity to amend it from a perfect specimen, which I mistook at first for a distinct species.

G. venustella. Proc. Ac. Nat. Sci., January, 1860, p. 6. Fore-wings dark fuscous, with four equidistant costal streaks;† the first, near the base of the wing, quite short; the second extended obliquely across, or nearly across, the wing, and constricted or partially interrupted near the middle; the third likewise oblique, but narrower than the second, extended to the middle of the wing; the fourth, near the tip of the wing, slender, curved, nearly vertical to the costa and *all dark-margined internally.* The basal portion of the inner margin is white. Cilia dark fuscous, at the tip of the wings white, touched with black at their ends, and having a few black-tipped scales in the middle of the white spot. Hind-wings dark fuscous, cilia the same.

Antennæ fuscous. Head and face white. Labial palpi white, the 2nd joint fuscous at its end and the third with a broad fuscous ring, leaving the extreme tip white.

Taken on wing the 25th of July.

* See *ante*, p. 92. H. T. S.

† Dr. Clemens has omitted here *the colour of these streaks*, but at p. 92 they are described as white. H. T. S.

GELECHIA, Zeller.*

Hind-wings trapezoidal, slightly or deeply emarginate below the apex. The costal vein is simple, often there is a narrow *intercostal cell* between the costal and subcostal veins at the base of the wing. Most frequently the subcostal vein is bifid about its apical third, rarely the subcostal vein is simple. The median vein is 3-branched and nearly always the two upper or superior branches arise from a common stalk, or from one point. The discal cell is sometimes closed, when it gives rise to a single nervule; sometimes unclosed, when there is a single free discal nervule or none. When the subcostal vein is simple, there are *two discal nervules.*

Fore-wings oblong or elongate, pointed or obscurely pointed. The apical nervule of the subcostal vein is usually furcate and terminates in the costa before the apex, and below it are five veins from the posterior end of the discal cell. Sometimes the apical vein is trifid.

Head smooth. With or without ocelli. Antennæ with joints thickly set. Labial palpi moderately long, or long, reflexed; the second joint beneath slightly broader than the basal joint, with appressed scales, hardly resembling a brush, sometimes quite smooth; the terminal joint slender, almost needle-like, *smooth* and pointed. Maxillary palpi very short. Tongue of moderate length, clothed with scales.

This genus is of great extent and comprises a considerable diversity of species. The imago is extremely active.

The habits of the larvæ are extremely varied, feeding upon leaves, flower-buds, young shoots, in the interior of grains and seeds. The species that feed in buds and shoots are mostly in the larva state in spring and the beginning of summer; those that feed in and upon leaves are met with in summer and autumn, and those that feed on seeds do so in the autumn and winter.

Cl. typ. 18] *G. nigratomella.* Fore-wings shining white. The apical portion of the wing is pale brown and contains an oblique

* See *ante*, p. 112. H. T. S.

white streak margined internally, on the costa, with dark brown. Beneath the tip is a small black spot, towards which the oblique white streak is directed. Along the costa, between the tip and the costal end of the white streak, are two or three white spots, and the cilia of the apex of the wing are touched with dark brown. On the middle of the costa is a short, oblique, dark-brown streak. Hind-wings and cilia a little darker than the fore-wings.

Antennæ pale yellowish. Head and face whitish. Labial palpi, second joint fuscous externally except at the extreme tip, where it is white; terminal joint white, with a dark external fuscous line.

84. *G. mediofuscella.* Fore-wings very pale yellowish, with a dark-brown spot along the costa, extending from near the basal third of the wing to the fold, oblique on its internal edge. At its angle on the fold is a blackish-brown dot, and another of the same hue obliquely above it on the edge of the spot. Exteriorly the spot is lost along the costa in dark-fuscous dispersed atoms, with which the apical portion is dusted. Hind-wings shining pale gray; cilia tinted with yellowish.

Antennæ annulated with dark fuscous and whitish. Head yellowish-white. Labial palpi whitish, with two dark-fuscous spots on the exterior of the second joint; terminal joint dark fuscous at the base and, thence to the tip dotted with fuscous atoms.

85. *G. fuscopunctella.* Fore-wings dark gray, with three dark-fuscous spots along the costa; a small one near the base, beneath which obliquely are two small ones of the same hue, one on each side of the fold; one at the beginning of the costal cilia, sometimes indistinct, beneath which, in the middle of the wing, are two dark-fuscous dots, one placed above the other; and midway between the two costal spots is a larger costal spot, with a dot of the same hue beneath it in the disk. The largest costal spot, and that nearest the base of the wing,

are slightly margined beneath with pale brown. The hinder border, at the base of the cilia, has three or four dark-fuscous dots. At the basal end of the fold is a dark-fuscous dot and another at the extreme base of the costa.

Antennæ dark fuscous. Head dark gray. Labial palpi gray; second joint dark fuscous externally; terminal joint with two blackish rings, one near the middle and one near the tip.

G. gilvomaculella. Fore-wings dark brownish, with an indistinct yellowish spot on the costa near the base of the wing; one of the same hue on the middle of the costa, extended indistinctly or diffusely to the fold, where there is a blackish-brown spot; a yellowish streak on the costa near the tip, with an opposite one of the same hue on the inner margin. Cilia yellowish. Hind-wings dark grayish, cilia grayish-fuscous.

Antennæ dark fuscous. Head fuscous, somewhat yellowish in front. Labial palpi dark fuscous, the end of the second joint yellowish-white and somewhat varied with yellowish; terminal joint with the extreme tip, and short streak about the middle, *internally*, yellowish-white.

G. longifasciella. Fore-wings dark purplish-brown, with a broad white band, beginning on the costa near the base and curving towards the middle of the inner margin, of which it covers at least one-third. Near the beginning of the cilia of the inner margin, it is constricted or pointed, and then dilates into a white spot behind the tip. Cilia whitish. Hind-wings pale grayish; cilia the same.

Antennæ annulated with white and purplish-brown. Head white. Labial palpi, second joint dark fuscous, with the tip white; terminal joint white, the extreme tip and middle fuscous.

I have two mutilated specimens from Mr. A. S. Packard, Jr.

G. Labradoriella. Fore-wings dark fuscous, with a white spot on the costa at the extreme base, and two white bands, one near the base of the wing, and inclined towards the anal angle, the other near the tip and parallel with the hinder margin; between the two bands, on the costa, is a rather large white spot.

Antennæ dark brown. (The head is entirely denuded of scales and the labial palpi have been broken off.)

I have a single specimen from Mr. A. S. Packard, Jr., collected in Labrador.

Phyllocnistis, Zeller.*

Proc. Acad. Nat. Sci., Nov. 1859, p. 327.

P. Liriodendronella. Fore-wings silvery-white, the posterior portion of the wing pale golden, *with a broad pale golden streak* along the middle of the wing above the fold, arising at its base. About the middle of *the costa is a pale golden, oblique costal streak black-margined on both sides,* which coalesces with the posterior end of the median streak. The costal cilia silvery, *containing three diverging black streaks.* The apical spot black, with a silvery scale or two before and behind it, and at the extreme apex, two black lines in the cilia, diverging from the apical spot. In the cilia of the hinder margin is a black, curved line, and at the beginning of the cilia of the hinder margin is a dorsal silvery spot. Hind-wings silvery-gray; cilia the same.

Antennæ, head, labial palpi silvery-white.

The larva mines *the small terminal leaves* of the branches of the tulip-tree. It is without feet. The body tapers from the head, the terminal portion being slender and pointed, deeply incised, almost moniliform. Head thin and flat. It makes a broad linear mine *on the underside of the leaves,* leaving a brownish "frass" line. The mine is much contorted and very long, so as often, if not always, to take up the

* See *ante*, p. 82. H. T. S.

entire under surface of the leaf, winding over it so as to detach nearly all the under epidermis. This is extremely delicate and of a bluish-white colour, and often the greater portion of it is detached by abrasions.

The larva may be taken from the beginning to the latter part of July. My own specimens were found on the 22nd of July, at which time they were nearly full fed. Taken in the latter part of the month it is very easy to rear the larva and obtain the most perfect imagos.

Tischeria, Zeller.*

T. quercitella. Fore-wings orange-yellow, apical portion of the wing reddish-brown, dusted with dark brown. Hind-wings pale yellowish, towards the apex reddish-brown and the apical cilia dark brownish. Antennæ, head, labial palpi dark orange-yellow.

The larva makes a white, blotch mine on the upper surface of the leaves of the oak in September and October. About the middle of the mine is a spot whiter than any other part, circular and more opaque. On this spot, when full fed, the larva spins a circular whitish cocoon. The head of the larva is circular; body flattened, tapering posteriorly. Head dark brown; *second segment* with a dorsal dark-brown spot divided by a paler vascular line; body pale yellowish-green immaculate.

I have before me a single specimen whose wings are not fully grown.

* See *ante*, p. 79. H. T. S.

[Extracted from the Proceedings of the Entomological Society of Philadelphia., Vol. II. pp. 119—129, August, 1863.]

AMERICAN MICRO-LEPIDOPTERA.

BY BRADKENRIDGE CLEMENS, M.D.

Tineina.

Gelechia.*

194 *G. angustipennella.* Fore-wings white, dusted with fuscous from the basal third of the wing to the apex, with a blackish-brown dot in the middle of the wing behind the tip, and two dark-fuscous dots near the costa at the base of the wing, beneath the second of which is an oblique, short fuscous streak. Cilia fuscous. Hind-wings dark fuscous, cilia the same.

Antennæ white, dotted with fuscous above. Head and thorax white. Labial palpi white, second joint with a dark-fuscous spot near the ends of the second joint; terminal joint with a broad blackish-brown ring at the tip, leaving the extreme apex white.

193 *G. punctiferella.* Fore-wings white. Near the base of the fold is a blackish dash, and above this in the middle of the wing is a blackish dot and a third one of the same hue, so placed posteriorly as to form a triangle with the other two. Immediately behind the latter, and above the end of the fold, are two blackish dots, placed one above the other. Around the apex and posterior margins, the wing is dusted with dark fuscous. Cilia yellowish-brown. Hind-wings yellowish-brown, cilia the same.

* See *ante*, pp. 112 and 217. H. T. S.

Antennæ yellowish-brown. Head and thorax rather sordid white. Labial palpi whitish, second joint dusted externally in the middle with fuscous; terminal dusted with fuscous, extreme apex white.

G. gilvolinella. Fore-wings pale yellowish, dusted with dark fuscous, especially towards the tip and along the costa from the middle to the tip. Near the tip is an oblique, pale-yellowish line from the costa, extended to a spot of the same hue beneath the tip. Behind this line in the middle of the wing is a blackish-brown dot. Between the costal end of the line and the tip of the wing are two or three small pale-yellowish costal dots, and a few on the margin beneath the tip, sometimes indistinct. Cilia yellowish-fuscous. Hind-wings fuscous, cilia the same.

Antennæ annulated with yellowish and fuscous. Labial palpi fuscous, terminal joint yellowish, fuscous at the base.

G. apicilinella. Fore-wings pale yellowish, dusted with fuscous, with a fuscous dot near the middle of the fold, and two others of the same hue beyond it in the middle of the wing, placed longitudinally.

The apical portion of the wing is more freely dusted with fuscous than that towards the base; the cilia at the extreme tip, *touched on their ends with fuscous, so as to make a fuscous line.* Cilia very pale yellow. Hind-wings rather paler than the fore-wings, cilia concolorous.

Antennæ annulated with pale yellow and fuscous. Head and labial palpi pale yellowish.

G. pullifimbriella. Fore-wings dark fuscous, tinted with yellowish, with an indistinct black dot in the middle of the fold, one of the same hue in the middle of the wing above it, and one likewise blackish-brown in the middle of the wing above the beginning of the cilia of the inner margin, the former rather indistinct. Hind-wings somewhat lurid.

Antennæ dark fuscous. Head rufo-fuscous, face beneath

somewhat yellowish. Labial palpi dull ochreous; second joint somewhat fuscous beneath, terminal joint with fuscous atoms.

The following table of species may facilitate the recognition of species. Some of them included in the table have been described in the Proc. Ac. Nat. Sci., May, 1860, p. 162.*

Fore-wings white or yellowish.

With no sharp markings in apical cilia.

1. With an oblique line near tips.
   - Fore-wings white or yellowish, with costa white. — *nigratomella* [p. 217].
   - Fore-wings yellowish-fuscous. — *gilvolinella* [p. 223].
2. With a large median costal patch. — *mediofuscella* [p. 218].
3. With discal spots or dots.
   - Well dusted with fuscous nearly to the base. — *angustipennella* [p. 222].
   - Slightly dusted with fuscous. — *punctiferella* [p. 222].
4. Without distinct dots, wings nearly unicolorous. — *Cerealella* [p. 112].

With sharply marked line in apical cilia. — *apicilinella* [p. 223].

Fore-wings dark gray or dark brown, without roseate hue.

Fore-wings with bands.

1. Bands transverse.
   - With two white bands and costal spot. — *Labradoriella* [p. 220].
   - With one concave yellow band. — *Agrimoniella* [p. 112].

* See *ante*, pp. 112—116. H. T. S.

With one band near the apex, doubly curved.	
Hind-wings apex produced.	*flexurella* [p. 115].
Hind-wings apex rounded.	*mimella* [p. 116].
2. Bands long, longitudinally curved, white.	*longifasciella* [p. 219].
Fore-wings with costal spots or dots.	
The spots black.	*fuscopunctella* [p. 218].
The spots rather indistinct, yellowish.	*gilvomaculella* [p. 219].
Fore-wings with discal spots.	
Hind-wings broader than the fore-wings.	*Rhoifructella* [p. 114].
Hind-wings as narrow as fore-wings.	
Fore-wings dark fuscous, tinted with yellowish.	*pullifimbriella* [p. 223].
Fore-wings grayish, dusted with fuscous.	*detersella* [p. 116].
Fore-wings with a roseate hue.	
With alternate white and dark brown bands.	*roseosuffusella* [p. 113].
Without distinct bands.	*rubidella* [p. 115].*

HOLCOCERA, new gen.

Hind-wings slightly excised along the costa. Subcostal vein simple, attenuated towards the base. The discal vein is oblique, and gives off two branches, one central, the other a curved medio-discal branch. Median vein three-branched, the two superior branches arising from a short common stalk. The submedian distinct.

Fore-wings elongate-lanceolate. At the discal third of the wing the subcostal vein sends off a marginal branch, and at

* *G.? flavocostella*, p. 113, does not appear in this table, having been removed (see p. 180) to the genus *Trichotaphe*. H. T. S.

the end of the disk, two others to the costa behind the tip and a furcate apical branch near its end, the lower branch running into the apex of the wing. Beneath the apical are five nervules, the posterior two of the median vein arising close together. The submedian forked at the base.

Head large, smooth, with hair-like scales. Face broad, not tapering, rounded. No ocelli. Antennæ about one-half as long as the fore-wings; basal joint in the ♂ ciliated in front, rather long, flattened, concave within, articulates with the stalk by means of a nodule, at the junction of which with the stalk, *it is sharply excised*, and the stalk beneath, microscopically pubescent: in the ♀ the basal joint is long, cylindrical, stalk scarcely pubescent beneath. Labial palpi cylindrical, ascending equal to the vertex, rather widely separated; second joint slightly thickened beneath with scales, rather longer than the terminal; terminal joint slenderer than the second, smooth and pointed. Maxillary palpi very short. Tongue scaled at the base, as long as the thorax beneath.

The perfect insects bear some resemblance to those of the genus *Gelechia;* they are sluggish in their motions and flight.

2. *H. chalcofrontella.* Fore-wings pale yellowish, dusted with fuscous, so as to produce two or three ill-defined fuscous spots along the costa, from the middle of the wing, and one on the middle of the inner margin. Near the tip is a wavy fuscous line, and the ends of the nervules are touched with the same hue. In the middle of the wing is a blackish-brown dot, and usually one of the same hue beneath it in the fold. Above the end of the fold are two blackish-brown dots in the middle of the wing, one above the other. Hind-wings yellowish-fuscous, cilia the same.

Antennæ, basal joint pale yellowish, stalk dark fuscous. Head pale yellowish. Labial palpi fuscous, the end of the second joint pale yellowish, and the extreme tip of the terminal joint yellowish in the ♂.

This insect appears to be a variable one. 1st. Sometimes the wings are *entirely fuscous, with but little yellowish,* when

of course the costal markings are not distinguishable, *but the dots are conspicuous.* 2nd. Sometimes the fore-wings are yellowish-fuscous, with the median dot distinct, but those at the end of the fold indistinct, and the costal markings wanting. The dots on the middle of the wing and above the end of the fold are the most constant markings.

H. purpurocomella. Fore-wings uniform dark purplish-fuscous, with an indistinct, blackish median dot, and two of the same hue in the middle of the wing above the fold. Hind-wings dark yellowish-fuscous, cilia the same.

Head and thorax fuscous with a reddish hue. Face tinted with yellowish. Labial palpi fuscous.

H. gilbociliella. Fore-wings pale yellow, with a black dot in the middle of the wing, and slightly dusted with fuscous towards the apex. Hind-wings pale ochreous-fuscous.

Antennæ dark ochreous. Head and labial palpi pale yellowish.

The fore-wings of the female are more dusted with fuscous than those of the male.

H. modestella. Fore-wings fuscous, the basal portion of the wing is paler and shining, and has a faint grayish hue; in the middle of the wing is a dark fuscous spot.

Antennæ, head and labial palpi fuscous.

YPSOLOPHUS, Haw., Zell.

Wings elongate, with moderate cilia.

Hind-wings trapeziform, slightly retuse before the apex; with an intercostal cell. Subcostal vein furcate. Discal vein curved, with a central nervule. Median vein three-branched, the two superior nervules given off from a common stalk. Submedian vein distinct; internal obsolete.

Fore-wings narrow; discal end narrow. The apical branch of the subcostal vein is furcate, and enters the costa behind the tip, and behind it are three subcosto-marginal

branches. The posterior branch of the median is furcate. Submedian furcate at the base.

Head smooth. Ocelli none (?). Antennæ setaceous, remotely denticulated in the ♂, microscopically ciliated. Labial palpi with the second joint beneath *formed like a brush, with the hairs produced in front;* the terminal joint *smooth, pointed, recurved and needle-like.* Maxillary palpi not perceptible. Tongue of moderate length, clothed with scales.

The labial palpi in the imagos I refer to this genus are not so much like a brush as those of *Y. parenthesellus* of Europe, for a specimen of which I am indebted to Mr. H. T. Stainton of London. In our species the second joint of the palpi has not the long brush-like hairs along its under surface, but are arranged almost into a tuft at the end of the joint.

The species described by Dr. Fitch, under the generic name of *Chaltochilus,* belong to this genus. I have been unable to recognize any of the following in his descriptions.

Coleophora 205 *Y. punctidiscellus. Wings narrow.* Fore-wings pale ochreous, dusted and [? with, H. T. S.] brown; along the costa towards the base paler, rather whitish. At the base of the fold is a brown dot, two of the same hue about the middle of the wing, and one or two, likewise brown, at about the end of the disc. Near the tip is an indistinct yellowish line, with a brown band exterior to it. The hinder margin has a series of blackish dots at the base of the cilia. Cilia similar in colour to that of the fore-wings. Hind-wings somewhat plumbeous gray.

Antennæ annulated with pale yellowish-brown and deep brown. Head pale yellowish-brown. Labial palpi, second joint dark fuscous, pale ochreous at the end; terminal joint pale ochreous.

Coleophora 206 *Y. pauciguttellus.* Fore-wings rather dull, uniform earthen brown, irregularly and sparsely dotted with dark brown.

Cilia concolorous with the wing. Hind-wings brownish, *with a bluish iridescent hue.*

Antennæ dark brownish, not annulated. Head dark brownish. Labial palpi, second joint dark brown, whitish at the end; terminal joint dark brownish, striped internally with whitish.

Y. unicipunctellus. Wings rather broad. Fore-wings pale brownish-ochreous, with a purplish hue, slightly dusted with blackish. In the fold, about the middle, is rather an indistinct blackish dot, and one of the same hue in the middle of the wing about the end of the disk, *with two or three white scales on its interior margin.* Around the hinder margin is a series of blackish dots. Cilia unicolorous with the fore-wings. Hind-wings brownish.

Antennæ annulated with yellowish and brown. Head brownish-ochreous. Labial palpi, second joint brown, whitish at the end; terminal joint yellowish-white, sometimes dusted with brownish.

DEPRESSARIA.*

Wings with moderate cilia.

Hind-wings rather broad, generally with the *inner margin emarginate opposite the submedian vein and dilated or rounded opposite the internal vein.* The costal vein is long and contiguous to the costa. Subcostal vein simple. The discal vein distinct, throwing off two branches. Median 3-branched, the two superior on a short common stalk.

Fore-wings oblong, rounded at the apex. Discal cell long and rather narrow. The subcostal vein sends off four branches to the costa, the first from the basal third of the wing, the last, or apical, furcate. From the discal vein two branches are thrown off. The median vein is 2-branched, the posterior, given off opposite the third subcosto-marginal branch, being

* See *ante*, p. 137. H. T. S.

forked. The fold is thickened towards its tip and the submedian is forked at its base.

Head smooth, scales not appressed. Ocelli none. Antennæ with joints compressed, hardly denticulate, not pubescent. Labial palpi moderately long, reflexed; second joint beneath thickened and roughened with scales, *resembling a brush;* third joint slender, smooth, pointed. Maxillary palpi very short. Tongue of moderate length, scaled. *Abdomen flattened above, with projecting scales at the sides.*

The larvæ of this genus are extremely active, and feed on a variety of substances; some in rolled-up leaves of composite plants, some in the leaves, and others in the umbels of the *Umbelliferæ;* many of the latter descend from the plant on the slightest agitation, so that considerable caution is necessary in attempts to collect them. The full-fed larvæ descend to the ground and change to pupæ among the fallen leaves. The perfect insects have the peculiarity of sliding about when laid on their backs.

Cat. 174. *D. atrodorsella.* Fore-wings yellow-ochreous, with several (6 or 8) black costal dots from the base to the tip of the wing. On the basal portion of the disk is a black dot, beyond which, on the disk, is a rufous-coloured patch, extended towards the tip of the wing, and partially interrupted over the middle of the subcosto-marginal nervules. Cilia rufous. Hind-wings yellowish.

Thorax black. Antennæ dark fuscous. *Head above rufous, face blackish-brown above, yellowish beneath.* Labial palpi pale yellow; second joint dusted with blackish exteriorly; terminal, with two dark-fuscous rings, one near the base, the other near the tip.

I have before me a single specimen.

Enicostoma? Steph.

Wings broad, ovate. Cilia of hind-wings rather long.

Hind-wings broadly ovate; costa straight, hind margin rounded to the base, scarcely retuse before the tip. Costal

vein long, entering the costa behind the tip; subcostal simple, attenuated towards base; discal vein oblique, with two branches, the lower one arched. Median 3-branched, the two superior from a common point. The fold slightly thickened. Submedian and internal distinct.

Fore-wing, the first subcostal branch arises about the basal third, beyond which are three branches, the apical furcate near the tip, both branches entering the costa just above it. The origins of the first and second branches separated. Discal vein has two branches. Median 3-branched, the two posterior from a common point. Fold thickened. Submedian with basal fork.

Head rather rough*(?). No ocelli. Antennæ scarcely one-half so long as fore-wings, filiform, slightly denticulate beneath. Labial palpi arched, the whole of the terminal joint being above the vertex; second joint long, twice the length of the terminal, flattened, with appressed scales, except at the tip; terminal smooth, cylindrical, slender. Maxillary palpi not perceptible. Tongue at least twice the length of the labial palpi, scaled.

208 *E.? Packardella.* Fore-wings gray, tinted along the costa, especially at the base, with roseate; slightly streaked and dusted with deep brown. From the base of the wing, on the costa, arises a deep brown irregular stripe, which bends towards the inner margin to about the middle of the fold, and thence curves to the middle of the costa, and throws off, towards the inner margin, a short hook margined internally with white, and above it a streak towards the base of the wing with white in the angle. Hind-wings pale gray.

Antennæ fuscous, tinted with roseate at the base. Head gray. Labial palpi gray; second joint tinted with roseate and dusted with fuscous; terminal with a fuscous ring near the tip.

I have before me a single specimen, in tolerably good condition, received from Mr. Packard.

* Almost too much denuded to determine. B. C.

BRACHILOMA, new gen.

Wings with rather short cilia.

Hind-wings broadly ovate; costa arched; hind margin circular. The costal vein is long removed from the costa. The subcostal vein bifid beyond the discal, and with scarcely a distinct basal origin. The discal vein has a sweeping curve, with a branch on the side of the median system. The median 3-branched; the two superior branches arising at the junction of the discal with the median. Submedian and internal distinct.

Fore-wings oblong, rounded behind. The subcostal sends five branches to the costa, the first from the middle of the wing. The discal vein is oblique and sends off a branch from the subcostal and median side. Median 3-branched, aggregated, and arising opposite the origin of the last subcostal branch. Submedian long, with basal fork.

Head somewhat rough. Ocelli none. Antennæ pubescent beneath, about one-half as long as fore-wings. Labial palpi recurved, with tips quite equal to the vertex, smooth, cylindrical; second joint rather thick, with appressed scales; terminal slenderer than the second, pointed and about one-half as long. Maxillary palpi short, distinct. Tongue short, (?) scaled. Abdomen short, compressed laterally, slightly tufted.

Cl'Typ.h.210 *B. unipunctella.* Fore-wings pale ochreous, with a single black discal dot. Hind-wings similar in colour to the fore-wings.

Antennæ and head pale ochreous-brown. Labial palpi, second joint pale brownish; terminal joint white.

I have a single specimen, received from Dr. Jno. G. Morris, of Baltimore.

PIGRITIA, Clemens.*

Proc. Acad. Nat. Sci., May, 1860, p. 172.

Cl'Typ 209 *P. ochrocomella.* Fore-wings pale yellow, with a broad

* See *ante*, p. 135. H. T. S.

band of fuscous atoms in the middle, and at the tip broadly dusted with the same hue. Hind-wings fuscous, cilia the same.

Antennæ dark ochreous. Head shining pale ochreous.

A single specimen, a male, and, as in other species of this genus, is without labial palpi.

P. ochreella. Fore-wings, hind-wings, and the cilia of each, shining ochreous and immaculate.

Antennæ russet-coloured. Head and labial palpi ochreous.

A single specimen.

TINEA, Zeller.*

Proc. Acad. Nat. Sci., September, 1859, p. 257.

T. acapnopennella. Fore-wings white, with two small spots of fuscous scales on the costa near the base, one nearly at the base, the other within the basal third. In the middle of the fold is a small spot of brown scales, and obliquely above it, in the middle of the wing, another of the same hue. Towards the tip of the wing is a spot of brown, rather dispersed scales, reaching the hinder margin beneath the tip. Cilia white. Hind-wings dark gray.

Antennæ yellowish. Head whitish. Labial palpi white, dusted with fuscous.

I have before me a single specimen, slightly worn.

The following insects differ in some respects from the genus to which they appear to belong, and instead of indicating them as a new genus, I have concluded to describe them as a group of the genus *Tinea*. The principal difference between the members of the group below, and the genus, is in the neuration of the hind-wings; and even here, the type is essentially the same, except that they are so much more narrow and differently formed, that the submedian and internal veins are obsolete.

* See *ante*, p. 49. H. T. S.

Group Homosetia.

Hind-wings very narrow, linear-lanceolate. Internal border without basal angle, *costa arched at the basal third, and concave thence to the tip. Without submedian or internal veins.* The subcostal vein is simple, much attenuated from the middle to the base, and enters the costa behind the tip of the wing. The cell is closed by a *very indistinct* discal vein and gives rise to two branches; the upper one, sometimes attenuated towards its origin, is delivered to the tip of the wing; the lower one, sometimes on a common stalk with the superior branch of the median vein, runs to the hinder margin beneath the tip. The median vein runs near the inner margin, is 3-branched, the posterior vein becoming quickly identified with the margin.

Fore-wings narrow, lanceolate. The costal vein almost identified with the costa. The subcostal attenuated towards the base, and gives off, at the basal third, a long marginal branch, and from the hinder part of the discal cell four branches; the discal vein throws off two branches. The median is 3-branched, the posterior, sometimes attenuated at its origin, remote from the others. The fold is thickened at its end. Submedian simple.

Head rough. Ocelli none. Antennæ filiform, with joints closely set, more than one-half as long as the fore-wings. Labial palpi cylindrical, smooth, slender, much separated, and depressed; the second joint furnished with a few bristles; terminal joint slenderer than second, about one-half as long. Maxillary palpi folded, 5-jointed. Tongue scarcely as long as labial palpi.

T. tricingulatella. Fore-wings gray, slightly dusted with fuscous. At the base of the costa is a fuscous spot, and at the basal third of the wing a fuscous band, scarcely extended to the inner margin. In the middle of the wing is a broad, irregular band, dark fuscous internally and externally, of a brassy brown colour. Near the tip of the wing are two

irregular somewhat curved bands, fuscous, tinted with a brassy hue, and between each of the bands on the costa are fuscous spots, leaving the costa from the middle to the tip alternately dotted with fuscous and pale gray. At the extreme apex the wing is slightly dusted with fuscous. Cilia pale. Hind-wings fuscous, with a brassy lustre.

Antennæ grayish. Head blackish, gray above; face whitish. Labial palpi whitish; second joint fuscous externally.

I have before me a single specimen.

T. costisignella. Fore-wings tawny, with about eight white costal spots from the base to the tip of the wing, separated by dark-brown costal spots. The tip of the wing and the inner margin from the middle to the tip varied with white and dark brown, so as to produce irregular spots. Cilia whitish, spotted with dark brown, especially beneath the tip. Hind-wings dark brown, with a brassy hue; cilia pale.

Antennæ dull tawny. Head whitish. Labial palpi tawny yellow.

Taken in damp places in woods, the first of June.

I have a single specimen.

Chauliodus ?, Treit.

Wings with long cilia.

Hind-wings very narrow, linear lanceolate; the costa is dilated about the basal third and thence concave to the tip. The costal vein is distinct, and enters the costa beyond the dilated part. The subcostal vein much attenuated and bifid beyond the discal vein, which is obliquely curved, and gives rise to a discal branch. The median vein is distinct, 3-branched, the posterior a little remote. The submedian is almost obsolete.

Fore-wings narrow, lanceolate. No secondary cell. Discal cell long and narrow. The first subcostal branch is rather long, and arises about the middle of the wing; three other

branches are given off, rather remote from the first, the apical branch being furcate, with both branches entering the costa behind the tip. Discal vein obliquely inclined towards the base, with two branches. The median vein with three rather long branches, the posterior arising nearly opposite the middle of the space between the first and second subcostal branches. Submedian furcate at the base.

Head smooth, broad in front, forehead rounded. No ocelli. Antennæ filiform, about one-half as long as the fore-wings, with joints closely set, basal joint short (with short hairs in *Chauliodus**). Labial palpi recurved, so as to equal the vertex; second joint subclavate, slightly thickened with scales towards the end; terminal joint cylindrical, slightly roughened, nearly equal in length to the second, pointed. No maxillary palpi. *Tongue wanting.* (In *Chauliodus*, short and naked.)

214. *C.* ? *canicinctella.*—Fore-wing dirty whitish towards the base, apical half fuscous, varied with blackish. An irregular whitish band near the tip, inclined towards the base, margined externally with a short black line from the inner margin, and with two short exterior black dashes, one in the middle of the wing, one on the costa. The internal edge of the fuscous portion of the wing is inclined towards the tip and margined with whitish. The extreme apex is blackish, and the cilia around it whitish, sprinkled with black. Cilia fuscous. Hind-wings fuscous.

Head and labial palpi whitish; the terminal joint of the latter with two fuscous rings, one about the middle and one at the tip.

I have before me two mutilated specimens, one simply with a pair of wings, received from Mr. A. S. Packard, Jr., and numbered by him 790.

* In the specimen before me the basal joints have been denuded by mites. B. C.

[Extracted from the Proceedings of the Entomological Society of Philadelphia, Vol. II. pp. 415—430, March, 1864.]

NORTH AMERICAN MICRO-LEPIDOPTERA.

BY BRACKENRIDGE CLEMENS, M.D.

Labradorian Tineina.

Tinea.

1. *Tinea biflavimaculella.** Proc. Acad. Nat. Sci., Sept. 1859, p. 257.

A single, much mutilated specimen collected in Labrador by Mr. A. S. Packard, Jr., and numbered 1631.

Mr. Stainton remarks in his Observations on American Tineina: This insect is closely allied to, if not identical with, *Tinea Spilotella* (see Linn. Ent. vi. p. 108, *Rusticella*, var. b.). *Spilotella* appears confined to the North of Europe, occurring in Finland and Scotland.

Ornix. †

2. *Ornix Boreasella,* n. s. Fore-wings dark fuscous, with two white costal spots, one exterior to the middle of the costa, and the other midway between the first and the apex of the wing; and with two white dorsal spots, one a little interior to the first costal spot, and the other, with some scattered white scales, opposite the second costal spot. Cilia dark fuscous, with a white patch behind the second dorsal spot, and apparently a few white scales on the costa behind

* See *ante*, p. 50. H. T. S.

† See *ante*, p. 94. H. T. S.

the tip. The apical spot is not distinct if present, the apex being nearly denuded of cilia and scales.

The single specimen before me is much mutilated and without a head; therefore I was obliged to rely exclusively on the neuration of the wings to determine the genus to which it belonged. Compared with other members of the genus the venation of the wings varies slightly. In the fore-wings there are four subcosto-marginal nervules, and the apical nervule, which arises from the middle of the posterior end of the cell, is furcate at its extremity. The median vein is 3-branched. In the hind-wings the venation is the same as in other members of the genus, except that the inosculation of the bifid subcostal vein with the tip of the costal, and of the lower branch of the former with the furcate discal nervule, is almost obsolete and very indistinct.

The insect appears to resemble *Ornix guttea* of Europe, but cannot be identical, as the spots in *Boreasella* are nearly round instead of triangular as in *Guttea*, and the former has but two costal spots, while the latter has three.

The specimen was collected in Labrador by Mr. A. S. Packard, Jr., and was numbered 1621.

Incurvaria.*

3. *Incurvaria Labradorella*, n. s. Fore-wings fuscous with a brassy hue, with a white band at the basal third of the wing and an opposite dorsal and costal spot of the same hue at the apical third of the wing, and which nearly meet in the middle of the wing. Cilia concolorous with fore-wings. Hind-wings fuscous, somewhat iridescent. Head and antennæ dark fuscous.

In the fore-wings the apical vein is simple and enters the costa behind the tip. In the hind-wings the median vein is 3-branched; subcostal simple; discal nervules two. In ornamentation the insect bears strong resemblance to the *Elachistæ*.

* See *ante*, p. 89. H. T. S.

I have before me a single specimen collected by Mr. A. S. Packard, Jr., in Labrador.

GELECHIA, Zeller.*

Proc. Ent. Soc. Phila., March, 1863, p. 10.

4. *Gelechia brumella*, n. s. *Second joint of labial palpi with loose scales beneath, scarcely resembling a brush.* Fore-wings ochreous, clouded with dark fuscous at the base of the wing, narrowly along the costa and in the middle of the apical portion of the wing from about the termination of the disk to the tip, leaving a very irregularly formed, transverse ochreous stripe, a little exterior to the apical third of the wing. Cilia ochreous. Hind-wings dark ochreous.

Head yellowish-ochreous ?. Antennæ dark fuscous. Labial palpi ochreous, middle joint with a fuscous spot at base and one about the middle; terminal joint fuscous at the base, with a slight fuscous ring about the middle.

A single somewhat denuded specimen collected in Labrador by A. S. Packard, Jr., and numbered 1641.

5. *Gelechia Labradoriella.* † Proc. Ent. Soc., March, 1863, p. 12.

[Here follow descriptions of four Labradorian *Tortricidæ* and two *Crambites*, viz.:—

6. *Anchylopera plagosana*, n. s.

7. *Halonota Packardiana*, n. s.

8. *Lozopera ? fuscostrigana*, n. s.

9. *Antithesia bipartitana.* Proc. Acad. Nat. Sci., Aug. 1860, p. 346.

Crambus albellus. Proc. Acad. Nat. Sci., June, 1860, p. 204.

Crambus inornatellus, n. s.

* See *ante*, pp. 112, 217 and 222. H. T. S.

† See *ante*, p. 220. H. T. S.

I have a few specimens of Labradorian moths that I will not venture to describe, in consequence of their denudation and mutilated condition. Doubtless some of the specimens I have named and described in this paper may belong to the Fauna of Northern Europe, a fact which the want of good descriptive works has made it impossible for me to determine.

TINEINA OF THE UNITED STATES.

WALSHIA, new gen.

This genus is apparently related to the genera *Laverna* and *Chrysoclista* and partakes of the character of each of them.*

Hind-wings with long cilia, rather long, narrow and lanceolate. The costa is somewhat dilated near the basal third, and slightly excised about the middle. Inner margin rounded from the base of the wing to the tip. *The submedian and internal veins are obsolete,* the former is replaced by a submedian fold. The costal vein is simple. Subcostal vein attenuated towards the base; it appears to be simple, but is really bifid, the point of bifurcation being invisible except by transmitted light under a lens; the lower branch is continued through the disk as a false nervule. The disk is closed, becoming narrower behind or exteriorly. The median vein is very distinct and 4-branched, the three posterior branches being equidistant.

Fore-wings with large thick tufts of scales; the tips of the wings are bent or turned under, when closed, lanceolate and pointed. The disk is narrow. The subcostal vein has three marginal branches, the first arising from the middle of the disk; the apical branch is furcate, and enters the costa before the tip of the wing. Beneath the apical branch are five nervules to the inner margin.

* The most conspicuous tuft of scales on the anterior wings is placed near the costa, beyond the middle, but the thickened termination of the basal joint of the antennæ is the most striking peculiarity. H. T. S.

Head without ocelli, smooth with appressed scales. Antennæ as long as the body, slightly serrated beneath towards the tip; basal joint rather long, smooth, slender. Labial palpi smooth, moderately long, recurved, not ascending higher than the vertex; second joint slightly compressed, slightly broader than the terminal joint, which is cylindrical, about as long as the middle joint, of uniform diameter and scarcely acute. Maxillary palpi short, distinct. Tongue rather longer than the anterior femora, clothed with scales to the tip, densely at the base.

225 *W. Amorphella.** Fore-wings yellowish-fuscous, with a rather large blackish-brown patch at the base of the wing, somewhat varied with spots of the general hue, and a blackish-brown tuft, having the scales directed toward the tip of the wing, on the basal third of the fold, and a smaller one above it near the costa. Near the end of the fold is another small tuft of the general hue, having the ends of the scales tipped with dark brown, and in the middle of the wing, nearly adjoining the latter, is a large tuft of the general hue. Above the end of the fold is a small blackish-brown tuft, the scales of which are not so much erected as in the other tufts; between this and the central tufts is a blackish-brown patch, which sends a streak of the same hue into the fold. The apical portion of the wing is somewhat discoloured with brown, and along the inner margin, at the base of the cilia are five or six black dots. Cilia dull testaceous.

Antennæ fuscous. Head and thorax blackish-brown. Labial palpi yellowish-fuscous.

Mr. B. D. Walsh, to whose kindness I am indebted for three specimens of this moth, informs me that the larva burrows in a gall formed on the stem of *Amorpha fruticosa*, and undergoes its transformation within it.

* I received two specimens from Mr. B. D. Walsh. It is a handsome insect, expanding 7—8 lines. H. T. S.

GELECHIA, Zeller.*

Proc. Ent. Soc. Phila., March, 1863, p. 10.†

Gelechia? ornatifimbriella, n. s. Fore-wings dark brownish, varied slightly with ochreous. Cilia shining, pale ochreous, dotted with dark-brown scales. Hind-wings brownish-ochreous?

Head dark brown, with ochreous reflections. Antennæ dark brownish. Labial palpi dark brown.

An inconspicuous-looking insect, most probably an aberrant form of the genus, partaking of its characters and those of the group *Depressaria*. In size and general characters it resembles most strongly the *Gelechiæ;* its neuration is that of this generic group. In the hind-wings the subcostal vein is bifid, with an intercostal cell at the base of the wing, between the costal and subcostal veins. The median vein is 3-branched, the disk closed with a central nervule. The form of the wing is trapezoidal, tip slightly produced, and the hinder margin beneath the tip slightly excised. In the fore-wings the venation is as usual in the *Gelechiæ*.

It differs from the *Gelechiæ*, however, in the structure of the labial palpi, the second joint of which is almost brush-like beneath and the abdomen is somewhat flattened above.

I have two specimens from Illinois, neither of which are in very good condition, received from Mr. B. D. Walsh. They were captured by him in the winter, under the loose bark of trees.

Gelechia gallægenitella, n. s. Fore-wings white, but so freely dusted with black as almost to obscure the ground colour, especially between the bands. There are three oblique, black bands not distinctly marked, the first within the basal third of the wing, the second near the middle, the third, which is less distinct than the others, placed about the apical

* See *ante*, pp. 112, 217 and 222. H. T. S.

† See *ante*, p. 217. H. T. S.

third of the wing. Along the base of the costal and apical cilia is a line of black dots and the cilia are discoloured with blackish; cilia of the inner margin dark gray. Hind-wings pale gray; cilia grayish-ochreous.

Antennæ blackish, annulated with whitish. Thorax white, dusted with blackish. Head white, with the ends of the scales touched with blackish. Labial palpi blackish; middle joint with a central and apical white ring; terminal joint with a basal white ring, and one of the same hue, near the apex, which is blackish.

I have before me a single specimen in good condition, received from Mr. B. D. Walsh, of Rock Island, Illinois. He says respecting it: "It is a species of which I have bred two, from the oak-apple galls of *Cynips quercus-spongifica*, O. S. There is also a large *Tortrix*? larva that eats up the 'sponge' of these galls, leaving the central cell, the imago of which I do not know, but I suspect its normal food is oak-leaves, because I have found a very large *Notodonta* larva, which I know usually eats oak-leaves, engaged in the same operation. I know nothing of the larva of this species, but am *certain* both imagos came out of these oak-apples."

GRACILARIA, Zell.

Proc. Acad. Nat. Sci., January, 1860, p. 6;* Proc. Ent. Soc. Phil., March, 1863, p. 9.†

224 *Gracilaria coroniella*, n. s. Fore-wings dark yellowish, overlaid with purple. Near the middle of the costa is a large, triangular, pale yellow patch, the angle of which terminates at the fold of the wing and containing on the costa three or four purplish dots. A little posterior to the triangular patch is a small costal pale yellow spot. The apical portion of the wing is yellowish; cilia yellowish, tipped with black. Hind-wings shining gray; cilia dull dark gray.

* See *ante*, p. 91. H. T. S.

† See *ante*, p. 215. H. T. S.

Head dark yellowish. Antennæ dark fuscous, very slightly annulated with yellowish. Labial palpi yellowish, terminal joint dark brownish exteriorly.

This is a very handsome insect. I have a single specimen from Illinois, for which I am indebted to Mr. B. D. Walsh. His specimens were taken in the winter, under the loose bark of trees, and consequently the imago hybernates.

Depressaria, Haw.*

Proc. Ent. Soc. Phila., August, 1863, p. 124.†

Depressaria pulvipennella, n. s. Fore-wings dark, slightly reddish-ochreous, freely dusted and spotted with blackish-brown. The costa at the base is pale ochreous and is marked with blackish-brown, short striæ from near the base to the tip. On or near the disk is a blackish shade, or nearly square spot containing a white dot in a short streak thrown from it exteriorly. There is another blackish patch at the base of the fold. The hinder margin is indistinctly dotted with blackish; *cilia with a reddish hue.*

Thorax pale ochreous, dusted with dark brownish. *Face whitish; head touched above with reddish-brown.* Antennæ dark brown. Labial palpi dark brownish; middle joint dusted with whitish and the scales beneath touched with reddish; terminal joint blackish, with the extreme tip and a central ring reddish-ochreous.

A single specimen from Mr. B. D. Walsh, and a specimen in the collection of the Entomological Society of Philadelphia from the State of Virginia.

Besides the foregoing I am indebted to Mr. Walsh for some specimens of the smaller *Tineina*. Unfortunately they were set on strips of card, with the wings unexpanded, and have been too much denuded in the process of setting to enable me to determine precisely to what genus and species

* See *ante*, p. 137. H. T. S.

† See *ante*, p. 229. H. T. S.

they belong. One of these, which was taken in the winter time, hybernating under the loose bark of trees, is a *Lithocolletis*, either *Robiniella* or *Cratægella*, but possibly a new species. There were likewise new specimens of *Phyllocnistis*, so much denuded and worn that I cannot determine the species.

Depressaria cinereocostella, n. s. Fore-wings reddish-brown, grayish along the costa, marked with numerous short, black, longitudinal dashes. Hind-wings grayish-fuscous.

Head and thorax grayish. Labial palpi whitish; middle joint with two dark-brown patches and the ends of the scales beneath, touched with dark brownish; terminal joint dark brownish, with two grayish rings, one in the middle, the other at the extreme tip.

Virginia. Coll. Entomological Society of Philadelphia.

HAMADRYAS, n. gen.

This imago, which I have placed in a new genus, appears to me to be congeneric with a portion of the genus *Gelechia*.

The hind-wings are lanceolate. The submedian and internal veins distinct. Subcostal simple, attenuated towards the base. The disk is closed, and two nervules are given off from it. The median vein is 3-branched.

The fore-wings are lanceolate, with the inner margin dilated near the base of the wing. The subcostal vein has four branches, the first arising near the middle of the wing and the apical nervule furcate. The disk is closed, with two nervules given off from it. Median vein 3-branched, the posterior branch arising midway between the space opposite the origins of the first and second subcosto-marginal nervules. Submedian furcate at the base.

Head smooth, face and forehead broad. Ocelli very small. Antennæ rather thick, about one-half as long as the fore-wings, denticulated beneath. Labial palpi moderately long, curved, rather slender, smooth, pointed; the middle joint

slightly compressed, rather thicker and longer than the terminal joint, which is cylindrical. Maxillary palpi extremely short. Tongue clothed with scales at the base, and about as long as the anterior coxæ.

H. Bassettella. Fore-wings bright reddish-orange, sometimes tinted with yellowish-orange, with a black spot at the base above the fold of the wing, and a broad black stripe, showing bluish or greenish reflections, along the inner margin, extending from the middle of the fold to the tip of the wing and occupying nearly one-half of the breadth of it. Along the costa, about the middle of it, is a shining black stripe, which becomes narrower as it approaches the apical third of the wing. Cilia blackish. Hind-wings shining, dark greenish-black.

Head and thorax black. Antennæ black. Labial palpi yellowish-orange.

I am indebted to the kindness of Mr. H. F. Bassett, of Waterbury, Conn., for a number of specimens of this interesting gall miner. Mr. B. says the species is rather common in his neighbourhood, and the larva feeds in a gall found on "a species of oak which I call *Q. tinctoria.*"

The galls are formed on the smaller branches, three or four being aggregated, are globular, yellowish-brown, shining and hard.

The species is dedicated to the discoverer, who will doubtless work out its larval history.

Cycloplasis, n. gen.

This new generic type is an extremely novel and interesting one, not only on account of larval history, but the structure of the perfect insect. It is a type that is probably peculiar to our own continent.

The hind-wings are so extremely narrow as to be hair-like, or spine-like, dilated near the base, so as to resemble a paddle; they are adorned with very long cilia. The median vein is

very short and placed near the basal angle and is branchless. The subcostal vein is attenuated towards its base, is adjacent to the costa, distinct in the basal third of the wing, and runs through the middle of the setiform portion and is likewise branchless.

The fore-wings are narrowly lanceolate. The subcostal vein is attenuated towards the base, is placed near the costa and without branches. The median vein is distinct and placed in the middle of the wing; it is delivered to the acute tip of the wing, near which it is probably furcate, sending a very short, indistinct branch to the costa, which however can scarcely be seen under a $\frac{1}{10}$ inch lens. The submedian vein is obsolete.

Head smooth, with appressed scales. Face and forehead broad. Antennæ setaceous, short, slightly more than one-half so long as the body. Labial palpi short, separated; in the living imago, ascending but scarcely reaching to the middle of the face, slightly curved, slender, smooth and pointed; in dead specimens the palpi are depressed and much divergent laterally; the terminal joint is very short and indistinct. No maxillary palpi. Tongue naked, short, rather longer than the face.

When at rest the imago holds the posterior pair of legs elevated at the sides above the wings, and in walking—its motions are very active—uses them by making very rapid vibrations, during which they touch the surface for only an instant. The femora and tibiæ of the posterior legs are not hairy, but quite densely clothed with spines, and the feet of this pair appear to be without hooks. The antennæ are porrected.

The mine of the larva is like that of an *Elachista*, beginning as a long threadlike line and towards the latter part of larval life is enlarged into a blotch. When it has reached maturity, it cuts a perfectly circular disk from the upper cuticle of the leaf, folds it along its diameter and unites the edges of the circumference, so as to make a semicircle. When completed the larva, enclosed in its semi-circular co-

coon, lets itself fall to the ground, where it attaches the cocoon to some adjacent object.

219. *C. Panicifoliella.* Fore-wings dark brown, with a violet hue; from the middle to the tip, bright silvery, with a bright silvery band about the basal third. Cilia violet-brown. Hind-wings violet-brown, cilia fuscous.

Head and thorax silvery. Antennæ brown, touched with a silvery hue towards the base.

The larva mines the leaf of *Panicum clandestinum* early in July. My specimens were taken July 9th, and at that time many mines were tenantless and appeared to be old, and are characterized by the circular piece cut out of the upper cuticle. The mine begins near the base of the leaf as a minute, threadlike line and runs to the tip, thence returns along the side to the middle of it, when it is irregularly enlarged by the larva.

On July 12th, five specimens taken on the 9th began their preparations for pupation, and on the 25th of July two imagos made their appearance and continued to appear for several days subsequently.

Easton, Pennsylvania.

Elachista.

Cosmiotes. Proc. Acad. Nat. Sci., Jan., 1860, p. 9.* Ib., May, 1860, p. 172. †

220. *Elachista Brachyelytrifoliella.* Fore-wings dark grayish-brown from the base to the middle of the wing and thence to the tip, blackish-brown between the markings. The costa at the base is white, and connected with the white costa, about the basal third of the wing, is a short, oblique silvery-white costal streak. Near the apical third of the wing is another conspicuous silvery-white oblique costal streak, nearly meeting in the middle of the wing a dorsal streak of the same

* See *ante*, p. 97. H. T. S.

† See *ante*, p. 133. H. T. S.

hue. In the costal cilia, just above the tip, are two minute silvery-white streaks, black-margined internally. Beneath the tip the wing is slightly varied with pale grayish. Hind-wings grayish-brown, cilia the same.

Antennæ grayish-brown. Head in front and labial palpi silvery-white.

The larva mines the leaf of *Brachyelytrum aristatum* early in July. The mine at this period is a blotch, taking up most of the leaf, but the beginning is a threadlike line. My specimens were taken on the 9th of July, at which time the most of the mines I found were tenantless, and two of the larvæ were young. On the 12th of July, one of the larvæ left its mine to prepare for pupation; this it did by weaving a slight web in which the larva attached its anal prolegs, with the head downward. The larva that spun up on the 12th, appeared as an imago on the 25th of July.

Easton, Pennsylvania.

Adela, Lat.

Hind-wings oblong-ovate, with moderate cilia. The subcostal vein is simple, attenuated towards the base. The discoidal cell is closed by a doubly angulated vein, which throws from the upper angle a discal branch, furcate near the extremity and anastomoses with a false nervule in the middle of the disk. The median vein is 3-branched, the upper branch being medio-discal and closes the lower portion of the disk. Submedian and internal veins distinct.

Fore-wings oblong. The subcostal vein gives origin to four marginal branches, the first arising near the base of the wing and forms a secondary cell. (In the species described below, *Ridingsella*, the third marginal branch is furcate.) Two discal branches are delivered to the hinder margin from the discal vein. The median vein is 3-branched. The submedian furcate at its base.

Head rough, with hairlike scales; face beneath rather smooth. Ocelli none. *Eyes remote in both sexes.* An-

tennæ twice as long as the fore-wings in the ♂, slender, slightly thickened towards the base; in the ♀ shorter, and at the base downy. Labial palpi cylindric, slender, porrected, nearly naked on the sides exteriorly, with long hairlike scales, especially beneath. No maxillary palpi. Tongue of moderate length.

A. Ridingsella, n. s. Fore-wings coppery-brown, with a pale grayish-brown patch, dusted with black, in the middle of the wing, on the nervules. At the anal angle of the wing is a patch of four or five black spots, those placed along the margin each containing an embossed silvery-violet spot, and that nearest the base of the wing containing two silvery-violet spots. Across the middle of the wing is a silvery band, and towards the tip an oblique, silvery, costal streak which nearly reaches the most interior of the black patches above the anal angle. At the extreme tip of the wing is a silvery spot, and just interior to it is a short silvery band; between this and the oblique costal streak is a silvery costal spot, and one of the same hue on the inner margin nearly opposite to it, placed between the apical band and the last of the black patches. Hind-wings fuscous, with a reddish-purple hue.

Head, face and labial palpi fuscous, intermixed with dark ochreous. Antennæ annulated with white and dark fuscous.

Virginia. Coll. Ent. Soc. Philadelphia; taken by Mr. Jas. Ridings of Philadelphia.

Coleophora, Zell.*

Proc. Ent. Soc. Phil., March, 1863, p. 6.†

Coleophora Rosæfoliella, n. s. *Basal joint of antennæ tufted.* Fore-wings pale grayish towards the base, clouded with dark brownish from the middle to the tip, where the

* See *ante*, p. 88. H. T. S.

† See *ante*, p. 210. H. T. S.

colour is most decided. Cilia grayish-brown. Hind-wings blackish-brown, cilia grayish-brown.

Head and thorax white. Antennæ, basal joint white, annulated with black and white. Labial palpi white, dark brownish externally.

Case silken, covered with granulations. It is cylindrical, slightly compressed, the mouth slightly deflexed and the opposite end turned down slightly, hook-like. Colour brown, varied with gray and reddish-brown granulations.

I took the larva of this species on the 19th of April, feeding on the opening buds of the common hundred-leafed garden rose. During the winter, the case was attached to a thorn on one of the principal stems. The imago appeared on the 25th of May.

Easton, Pennsylvania.

Coleophora Rosacella, n. s. *Basal joint of antennæ slightly thickened with scales.* Fore-wing blackish-brown, with the costa from the base to the beginning of the costal cilia, narrowly touched with white. Cilia concolorous with fore-wings. Hind-wings blackish, cilia concolorous.

Antennæ, basal joint dark grayish-brown. Head and thorax dark grayish-brown. Labial palpi grayish, grayish-brown externally.

The case is made of the cuticle of the rose-leaf on which the larva feeds. It is a compressed cylinder, dilated slightly on the middle of the under edge and *serrated above.* Colour dark ochreous.

I took the larvæ on the 19th of April, feeding on the opening buds of the sweet briar, the leaf of which is strongly serrated, and I found the same species on the common hundred-leafed rose at the same time. The case of the latter differs from that of the larva of the sweet briar; it is smaller, but of the same form, not serrated along the upper edge, and with a slight projection on the middle of the under edge; its colour is grayish-brown. The cases of both are attached to the thorns of the bush during the winter, or to one of the

principal stems amongst the thorns, and it is not easy to distinguish them from the spines of the rose-bush.

Variety. Two specimens were obtained from the cases of sweet briar-feeders which varied in colour from the others, although the cases were not distinguishable. The imagos have the fore-wings dark ochreous, and the hind-wings dark brown.

The imagos appear during the latter part of May and early in June.

There is a strong resemblance between the variety of *C. Rosacella* and the European *C. Limosipennella*, the larva of which feeds on the elm-leaf.

Easton, Pennsylvania.

Dasycera, Haw.

Hind-wings ovate. The subcostal vein is simple. The discal vein, which closes the discoidal cell, gives rise to two discal branches. The median is 3-branched, the two upper branches arising on a common stalk. The submedian and internal veins are distinct.

Fore-wings elongate, lanceolate. The subcostal vein subdivides into four marginal branches, the apical furcate, both branches reach the costa behind the tip. The discal vein sends two branches to the hinder margin beneath the tip, and the median vein is 3-branched. The fold is thickened at its tip and the submedian furcate at its base.

Head smooth. Ocelli none. Antennæ towards the base thickened, with hairy scales on the back of the base, with the apex comparatively naked, slightly ciliated. Labial palpi reflexed, ascending above the vertex, the end of the middle joint equal with the forehead; the second joint compressed with appressed scales; the terminal joint slender, pointed, nearly as long as the second joint. Maxillary palpi short. Tongue somewhat longer than the anterior coxæ, clothed with scales.

D. Newmanella. Fore-wings purple, with an orange-

coloured stripe in the disk and a shorter one at the base of the wing in the fold and nearly joining the former. Hind-wings dark fuscous.

Antennæ dark purple, tip silvery. Head and face of a brassy hue. Labial palpi and tongue orange-yellow.

Virginia. Coll. Entomological Society of Philadelphia.

Wilsonia, n. gen.

Hind-wings very narrow and acutely pointed, with very long cilia. The costa is dilated near the middle. The submedian vein is nearly obsolete. The costal vein enters the costa just beyond the dilatation. The subcostal is simple, attenuated and obsolete from the middle of the wing to the base. The discoidal cell is closed by an extremely attenuated discal vein, which gives rise to two nervules, the upper of which appears to be a lower branch of the subcostal, but is unconnected with it, and is continued through the discoidal cell to the base of the wing as a false nervule. The median vein runs near the inner margin and subdivides into three equidistant branches.

Fore-wings lanceolate. The discoidal cell is long and narrow, and appears to be unclosed. The subcostal vein subdivides into five branches, the apical branch bifid, both its nervulets are delivered to the costa behind the tip. The median is 4-branched. The submedian furcate at its base.

Head smooth, with appressed scales. Without ocelli. Eyes small. Antennæ simple, about one-half as long as the fore-wings; basal joint slightly thickened with scales. Labial palpi recurved, tips equal, at least, to the vertex, rather slender, especially towards the base, with a spreading, limited tuft of scales over the articulation of the middle and terminal joints, and thence to the base smooth and slender; terminal joint about as long as the middle, roughed with scales from its base to the tip, cylindric, pointed and thicker than the basal portion of the middle joint and about as long. No maxillary palpi. Tongue clothed with scales, extremely short.

The genus is dedicated to Dr. Thomas B. Wilson of Philadelphia, in recognition of the eminent encouragement he has given to Entomological studies in the United States.

175. *W. brevivittella.* Fore-wings fuscous, intermixed with grayish, with three black longitudinal streaks or dashes; one at the base of the fold, another in the middle of the wing, and the last in the middle of the wing near the tip. On the inner margin are three small black spots, placed respectively beneath the dashes. Hind-wings fuscous, cilia the same.

Antennæ dark fuscous, basal joint yellowish. Head pale yellow. Labial palpi dark fuscous, the tuft and two rings on the terminal joint pale yellowish.

Virginia. Coll. Entomological Society of Philadelphia.

Ypsolophus, Haw., Zell.

Proc. Ent. Soc. Phil., Aug. 1863, p. 122.*

Ypsolophus flavivittellus, n. s. Fore-wings dark brown, yellowish along the costa from the base to near the tip of the wing. The yellowish streak is limited by the subcostal vein, and is slightly dotted with dark brown. Hind-wings fuscous.

Antennæ, head and labial palpi fuscous.

Virginia. Coll. Entomological Society of Philadelphia.

Anesychia, Steph.

Hind-wings rather broadly oblong, with short cilia. The subcostal vein is simple. The discoidal cell is closed by a transverse discal vein, which gives rise to two branches. The median vein is 3-branched, the two upper branches arising from a short common stalk. The submedian and internal veins distinct.

Fore-wings elongate-ovate. The subcostal vein subdivides into four branches; the first is given off near the middle of

* See *ante*, p. 227. H. T. S.

the wing and the apical branch furcate. The discal vein has two branches, and the median is 3-branched, all the branches being aggregated at its posterior end. The submedian furcate at the base.

Head smooth. Ocelli none. Antennæ of the males with the joints rather dentate and pubescent-ciliated. Labial palpi smooth, cylindric, moderately long, exceeding the vertex somewhat, *reflexed with the third joint pointed;* middle joint longer than the terminal joint. No maxillary palpi. Tongue of moderate length, clothed with scales towards the base.

According to Mr. H. T. Stainton the larvæ of this genus seem exclusively attached to plants of the Borage family, on which they feed.

Anesychia sparsiciliella. Fore-wings white, with deep-black markings. At the extreme base of the costa is a small black spot, and one on the inner margin at the base, of the same hue. On the middle of the costa is a rather large black spot, nearly square, but with a slight incision on its inner side and doubly curved on its exterior side. Near the middle of the fold is a black dot, and one obliquely above it in the disk. The apical portion of the wing is slightly dusted with dispersed black atoms, and near the hinder margin, on the ends of the nervules, are a few black dots. Cilia white, slightly dusted with blackish. Hind-wings dark gray, cilia the same.

Antennæ blackish, white at base. Head white. Labial palpi whitish, with a black stripe along the base of the middle joint.

Virginia. Coll. Entomological Society of Philadelphia.

Elachista ?

Hind-wings with very long cilia, cimeter-like, extremely narrow. The submedian and internal veins are obsolete. Subcostal vein parallel and contiguous to the costa and fur-

cate at the extreme tip of the wing. The discal vein is extremely attenuated and short, and gives off a furcate branch very near to the stalk of the subcostal vein.

Fore-wings narrowly lanceolate. The discoidal cell is very narrow. The subcostal vein sends off three branches to the costa; *the apical vein gives off a branch from its middle and is trifid at its tip.* Beneath the apical vein are three branches to the margin beneath the tip, two of which are branches of the median vein, the posterior being only faintly indicated. The submedian is furcate at its base.

Head smooth. Forehead rounded. Face rather broad. Basal joint of antennæ slightly thickened (*stalk wanting*). Labial palpi slightly curved, depressed, cylindrical, slender, pointed.

Elachista? orichalcella. The entire insect is of a beautiful, metallic, cupreous colour. The hind-wings and cilia are rather pale ochreous.

I have before me a single specimen, badly set but otherwise in good condition.

Virginia. Coll. Entomological Society of Philadelphia.

[Extracted from the Proceedings of the Entomological Society of Philadelphia, Vol. III. pp. 505—520, December, 1864.]

NORTH AMERICAN MICRO-LEPIDOPTERA.

BY BRACKENRIDGE CLEMENS, M.D.

Brenthia, Clemens.

Proc. Acad. Nat. Sci. of Phila., May, 1860, p. 172.*

Brenthia Virginiella, n. s. Fore-wings dark brown, tinged with ochreous between the markings toward the tip, with an oblique, somewhat violet-hued silvery line, from the costa at the apical third, directed toward the anal angle; a line of the same hue from the tip of the wing, parallel to the hinder margin, and a white costal streak equidistant from the two silvery lines. On the inner margin, a little interior to the anal angle, is a silvery, somewhat violet-hued spot. Cilia whitish beneath the tip of the wing, with a dark intercilial line. Hind-wings dark brownish, with a silvery spot near the hinder margin above the anal angle.

A single specimen. Virginia. Coll. Ent. Soc. Phila.

Gracilaria, Zeller.

Proc. Ent. Soc. Phila., March, 1863, p. 9.†

Gracilaria Blandella, n. s. Fore-wings yellow, dark purple along the dorsal margin from near the base to the tip of the wing. Near the tip is a projection from the dorsal stripe extended to the costa, and a little interior to the middle of the wing the dorsal stripe is excavated and presents a

* See *ante*, p. 133. H. T. S.

† See *ante*, p. 215. H. T. S.

blunt projection toward the costa. Near the base is a broad, dark purple band from the costa, which forms the interior limit of the excavation. The costa, from the band to the base of the wing, and the base of the inner margin, is dark purplish. Extreme base of the wing yellow. Cilia purplish, with an intercilial paler line. Hind-wings and cilia pale fuscous.

Face yellowish; head above tinted with purplish. Antennæ yellowish, annulated with purplish. Labial palpi yellowish, with a brownish spot on the end of the middle joint, and the tip of the terminal joint brownish.

A single specimen. Virginia. Coll. Ent. Soc. Phila.

Tinea.

Proc. Acad. Nat. Sci. Phila., September, 1859, p. 257.*

Tinea tapetzella, Lin. Fore-wings blackish at the base, extended further along the costa than on the inner margin; the remainder of the wing is yellowish-white. The whitish portion of the wing is marked with numerous, interrupted transverse blackish striæ, and at the base of the nervules, in the middle of the wing, is a blackish spot and two or three small ones at the apex of the wing. Cilia whitish, at extreme apex fuscous. Hind-wings dark gray, with paler cilia.

Head and face white. Palpi white; second joint externally dark fuscous. Antennæ fuscous.

This is an European insect and does not differ from the descriptions and figures of European authors. I have never before, however, met with a specimen of it and do not know the circumstances of its capture.

A single specimen. Virginia. Coll. Ent. Soc. Phila.

Coleophora, Zeller.

Proc. Ent. Soc. Phila., March, 1863, p. 6.†

Coleophora cratipennella, n. s. Fore-wings white, striped along the veins with dark ochreous. From the base of the

* See *ante*, p. 49. H. T. S.

† See *ante*, p. 210. H. T. S.

wing are three stripes, one along the submedian, median, *and a rather broad one between the costal and subcostal veins.* In the middle of the disk is another stripe, and about the middle of the wing begins a stripe along the subcostal vein, which subdivides into two branches, terminating on the costa; beneath these are two other stripes, one along the inner margin from the tip, the other in the middle of the wing. Cilia ochreous. Hind-wings fuscous; cilia yellowish-fuscous.

Antennæ white, annulated with dark ochreous. Labial palpi white, dark ochreous along the sides.

A single specimen. Virginia. Coll. Ent. Soc. Phila.

Gelechia.

Proc. Ent. Soc. Phila., March, 1863, p. 10.*

Gelechia gallægenitella, Proc. Ent. Soc. Phila., May [March, H. T. S.], 1864, p. 420.†

Since the description of this insect was given, Mr. Benj. D. Walsh has forwarded to me another specimen, under the impression that it was a distinct species. The differences in ornamentation between the two, and another in the collection of the Entomological Society of Philadelphia, deserve critical notice.

The original description of *gallægenitella* ought to be so modified as to read instead of "Fore-wings white, but so freely dusted with black as almost to obscure the ground colour, especially between the bands:" Fore-wings black, freely dusted with white.

The following is the description of the specimen last received from Mr. Benj. D. Walsh, the larva of which mines the same gall as *fungivorella*, the cabbage-like gall, *brassicoides*, peculiar to *Salix longifolia.*

Fore-wings dark gray, dusted with white. At the base of the wing is an oblique, blackish-brown band, which terminates

* See *ante*, p. 217. H. T. S.

† See *ante*, p. 242. H. T. S.

on the fold in a little tuft of brown scales. The band is margined exteriorly with whitish, and the wing along the base of the inner margin is pale gray. The middle of the wing has a large dark-brown shade, which is divided by a pale grayish, costal spot placed about the middle of the costa; in this shade is an oblique, blackish-brown band, which is parallel to the basal band, and beneath it, in the middle of the wing, are two small tufts of brown scales. At the base of the fold is a black dot, and one just above its termination, the latter encircled with white. The apical portion of the wing is somewhat dotted and streaked with whitish, and at the base of the costal cilia are a few blackish dots. Cilia grayish-fuscous. Hind-wings grayish; cilia grayish-fuscous.

A single specimen from Mr. Benj. D. Walsh, Rock Island.

The following specimen differs somewhat in distinctness of ornamentation of the fore-wings from the typical one in my possession, but I attribute this to the fact, that it is not in so good a state of preservation.

The fore-wings are blackish-brown, without distinct markings, and dusted with yellowish-white. The inner margin along the base is whitish; cilia pale ochreous-gray. Hind-wings pale grayish; cilia pale ochreous-gray.

Antennæ annulated with blackish and white. Head whitish, dusted with dark fuscous. Palpi, middle joint dark brown, white at the extreme tip; apical joint white, with two blackish-brown rings, one near the base, the other at the tip, leaving the extreme apex white.

A single specimen. Virginia. Coll. Ent. Soc. Phila.

C. & L. 87. *Gelechia nigratomella*, Proc. Ent. Soc. Phila., March, 1863, p. 11.*

Differs from the previously described specimen in the general hue of the fore-wings. The specimen under description has the fore-wings ochreous, and whitish along the costa

* See *ante*, p. 217. H. T. S.

at the base. There are five blackish-brown costal spots beginning on the middle of the costa, with intermediate white costal spots, the second being an oblique white line. In the middle of the wing, at the apex, is a white spot, with a blackish-brown dot beneath it. At the base of the fold is a brownish dot and another about its middle.

A single specimen. Virginia. Coll. Ent. Soc. Phila.

Gelechia fungivorella, n. s.* Fore-wings roseate-white, freely dusted with testaceous-brown along the inner margin from the base to the tip of the wing, the costal half of the wing being banded with alternate roseate-white dusted with brownish, and testaceous-brown bands. Near the base of the wing is an oblique testaceous band extended a little beyond the middle of the wing, margined externally by a roseate-white band, having a central line of brownish atoms. Another testaceous band, placed about the basal third of the costa, is oblique, and extends a little beyond the middle of the wing; its dorsal edge is convex and the costal edge concave; it is broadest in the middle of the wing and terminates in a point, just beneath which is a black or dark-brown dot encircled with white or roseate-white. Towards the apex of the wing is a semicircular, testaceous, costal patch margined with white or roseate-white. The apical portion of the wing is dusted freely with testaceous, and at the base of the cilia, near the anal angle, are one or two black dots. Cilia testaceous, with a white patch beneath the tip having a central dark-brownish cilial line, and a white or roseate-white patch at the anal angle.

Antennæ dark brown, slightly annulated with shining white. Head whitish, tinted with fuscous. Labial palpi white; second joint with three blackish rings, one at the base, one in the middle and one near the tip; terminal joint

* Of this I received two specimens from Mr. B. D. Walsh. The exp. al. is 5½—6 lines. H. T. S.

with four blackish rings, one at the base, two in the middle, and one at the extreme tip.

My friend Mr. Benj. D. Walsh, of Rock Island, Illinois, writes to me that "the larva mines a cabbage-like gall, *brassicoides*, peculiar to *Salix longifolia*, and a pine-cone-like gall on *Salix cordata* named *strobiloides* by Osten Sacken." The ornamentation of the imago is similar to that of *G. roseosuffusella*,* the larva of which inhabits the fruit panicles of sumach. Imago occurs August 1st—15th.

Bred by Mr. B. D. Walsh, Rock Island, Ill.

45? *Gelechia Salicifungiella*, n. s. Fore-wings red, irregularly marked with whitish. Near the base is a whitish band, powdered with dark fuscous, which curves across the fold, including the inner margin, and reaches the middle of the wing; the part beneath the fold is tinged with reddish and sometimes with pale brownish. Adjoining this band exteriorly is a dark brownish-red, curved band, which does not cross the fold. On the costa are three small white spots, one near the tip, one about the middle and one exterior to the brownish-red band. The margin of the wing is powdered with dark fuscous. Cilia red. Hind-wings dark gray; cilia grayish-fuscous.

Head reddish. Antennæ black, annulated with white. Labial palpi pale red; second joint with two blackish rings; terminal joint with three black rings and a black dot at the base, extreme tip black.

The larva mines the same gall, *brassicoides*, as *G. fungivorella*. Mr. Walsh bred six specimens, of which he was kind enough to send me three. Although *fungivorella* is tinged with roseate in the white markings, I can perceive no tendency in the eight specimens of this imago, that Mr. Walsh has so liberally sent me, to merge into the ornamentation of *Salicifungiella*. Certainly the character of the markings is the same in each, and it is possible that we have here but a single species. The imago occurs August 3rd—13th.

Bred by Mr. B. D. Walsh.

* See *ante*, p. 113. H. T. S.

[Then follow twelve pages devoted to the *Tortricidæ*, including a notice of the genus *Anchylopera*, with descriptions of—

A. ocellana,
A. mediofasciana,
A. fasciolana,
A. pulchellana,
A. fusociliana,
A. dubiana,
A. Virginiana,
A. Lamiana.

Also of

Hedya deludana,
H. spoliana,
H. Cressoniana,
H. signatana,
H. salicicolana,
H. saliciana,
Ditula? blandana,
Cnephasia? maculidorsana,
Peronea flavivittana,
P. gallicolana,
Crœsia? unifasciana,
C.? fulvoroseana,
C.? Virginiana,
C.? gallivorana,
Ptycholoma? semifuscana,
Steganoptycha? ochreana,
S. variana.]

[Extracted from the Proceedings of the Entomological Society of Philadelphia, Vol. V. pp. 133—147, September, 1865.]

NORTH AMERICAN MICRO-LEPIDOPTERA.

BY BRACKENRIDGE CLEMENS, M.D.

[The first portion of this paper (nearly ten pages) is devoted to the *Tortricidæ*, and the following species are described—

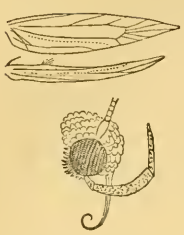
Stigmonota tristrigana,
Sericoris gratiosana,
S. concinnana,
S. mutabilana,
S. instrutana,
S. fœdana,
S. versicolorana,
Lozotœnia vesperana,
L. purpurana,
L. fractivittana,
L. fuscolineana,
Xanthosetia albicomana,
Steganoptycha crispana,
S. flavocellana,
Tortrix lutosana,
T. incertana,
T.? fumiferana,
Halonota tautana,
Leptoris breviornatana,
Smicrotes virescana,
Mixodia? intermistana,
Siderea? nubilana,
Euryptychia saligneana,
and
Callimosema scintillana.]

Tineina.

Batrachedra, Stainton.

Hind-wings very narrow, pointed; costa rather concave from the tip to near the base, *where there is a projecting tuft*, inner margin concave. The subcostal vein is simple, runs very near the costa and reaches it beyond the middle of the

wing. The median vein is simple and runs nearly parallel to the inner margin, and enters it nearly opposite the costal termination of the subcostal vein; between these, in the middle of the wing, originates an independent discal branch, which is obscurely furcate, its longest branch being lost before it reaches the apex of wing. There are two folds on the wing, which resemble veins; one above and parallel to the median vein, the other above and parallel to the discal branch.



Fore-wings elongate-lanceolate. *The discoidal cell is obliquely placed in the wing*, its lower angle approaching very near the dorsal margin of the wing. The subcostal vein is arched, and gives off a long, oblique, marginal branch from behind the middle of the wing, one at the superior angle of the cell and one intermediate. A very short and indistinct vein closes the cell posteriorly, and two indistinct apical veins succeed the third subcosto-marginal branch, one of which is delivered to the tip and the other to the costa behind the tip.* The median vein is 3-branched, the two superior branches sometimes from a common base and the posterior branch *extremely short* and indistinct; thence the median runs obliquely and direct to the base. The submedian is indistinctly forked at its base.

Head smooth, without ocelli. Antennæ rather more than one-half as long as fore-wings, setaceous, joints thickly set, without hairs; the basal joint *short*. Labial palpi moderately long, recurved, acute; second joint compressed, subclavate. Tongue moderate, clothed with scales.

4/3 *Batrachedra salicipomonella.*† Fore-wings fuscous, with a 4/5 rather broad whitish stripe, freely dusted with fuscous, run-

* The expression here used and illustrated by the figure shows clearly that by the words "*behind* the tip," Dr. Clemens meant what I should have called "*before* the tip." H. T. S.

† Of this I received two specimens from Mr. B. D. Walsh. The exp. al. is 5½ lines. H. T. S.

ning through the middle of the wing, from the base and along the apical margin to the tip. Near the basal third of the wing on the dorsal edge of the whitish stripe is an elongate, blackish-brown spot, and from the middle of the wing, towards the tip, it is edged on its costal side by a *blackish-brown line*, which contains sometimes a spot of the same hue. The apical portion of the stripe is more freely dusted with fuscous than the other portions. Cilia fuscous. Hind-wings fuscous, cilia paler.

Antennæ dark fuscous, without white annulations, except near the tip. Head fuscous above, face white. Labial palpi dark fuscous; second joint with a white ring at the extreme tip, sometimes white at the base, with a broad fuscous ring near the tip; terminal joint fuscous, with a more or less distinct whitish central ring and the extreme tip whitish.

This is a very interesting "Micro," not only in consequence of the specific resemblance it bears to the European *Batrachedra præangusta*, but of the discovery of its larva by one of our most gifted and promising Entomologists, Mr. Benj. D. Walsh, of Rock Island, Ill.

In the note which accompanied the perfect insects, Mr. Walsh writes: "I enclose herewith several specimens of a moth, bred from the Tenthredinidous gall, *Salicis pomum*, Walsh, MS., and a single one from the Cecidomyidous gall, *S. rhodoides*, Walsh. This is the insect that I think I mentioned to you as being very prettily marked in the larva state, each segment having a broad, black band and the ground colour being whitish. I had a single one come out last summer, but the great bulk of them hybernated either in larva or pupa state and came out May 8th—20th. They vary but little. I have beaten larvæ of very similar appearance off oak trees."

So far as I am informed, the larva is unknown to European Lepidopterists, although it is recorded that the perfect insect, *præangusta*, is very common among willows and poplars in July, and may frequently be observed sitting on the trunks of those trees with the anterior feet put back like *Bedellia*, and the head raised a little.

Mr. Walsh has the honour of having made an interesting

discovery, that puts an end to all uncertainty respecting the larva and its food plant.

In a subsequent letter Mr. Walsh kindly supplied me with the following description of the larva:

"Length ·20 inch. Body tapering at each end, opaque, milky-whitish, with a few short, whitish hairs. The first segment behind the head, with an obsemicircular, shining, glabrous, brown, dorsal shield; second segment with an interrupted, opaque brown, dorsal band on its anterior edge, the interruption occupying about one-third of the band; segments 3—12 with an uninterrupted, opaque brown, dorsal band on the anterior edge, and segment eleventh with a similar band at its tip also. Head yellowish. Legs and venter immaculate, whitish. Legs six, prolegs ten, normally arranged. Spins a thread, wriggles much when disturbed and runs backwards with great agility.

"This larva occurred in abundance August 23rd, and subsequently in the Tenthredinidous gall, *S. pomum*, Walsh, MS., which grows on the leaves of *Salix cordata*. Each gall contained but a single larva, unaccompanied by the larva of the *Nematus* which makes the gall, which it must consequently have destroyed or starved out, either in the egg or in the larva state.

"A single imago came out in the autumn of the same year, but the great bulk of them came out next spring, May 8th—20th, from galls kept through the winter. There can be no doubt of the correlation of larva and imago, because no other Lepidopterous larva or imago occurred in the gall *S. pomum*, though I had three or four hundred of them in my breeding-vase. The insect must hybernate normally in the larva state, for I noticed numbers of them in the spring crawling about among the galls. In a state of confinement it generally retires to the inside of the gall to assume the pupa state, though I noticed one or two cocoons spun among the galls. Probably in a state of nature it hybernates in the gall, comes out of it in the spring, and spins its cocoon amongst dry leaves and rubbish.

"I also bred a single imago of this same species, May 11th, from the Cecidomyidous gall, *S. rhodoides*," Walsh, from galls kept through the winter, and I found in the spring a denuded imago of what was apparently the same species, dead and dry amongst a lot of Tenthredinidous galls, *S. desmodiodes*, Walsh, MS., which is closely allied to *S. pomum*, but occurs on the leaves of a very distinct species of willow. Thus we have three different willow-galls inhabited by the same moth, two of them made by saw-flies and one by a gall-gnat.

"I have several times beaten off black-oak trees larvæ apparently very similar to this *Batrachedra*, and with the same harlequin-like markings, but whether the two are specifically identical, I cannot say."

Gracilaria, Zell.

Proc. Ac. Nat. Sci., Jan. 1860, p. 6;* Proc. Ent. Socy. Philad., March, 1863;† Id., Dec. 1864, p. 505.‡

I wish to redescribe and change the name of a species, whose history I have ascertained, and which I have recently bred.§ The first description was drawn from a rather worn specimen, but in the main is correct. In order that the species heretofore described may be more readily distinguished I have tabulated them as follows:—

Legs with white tibiæ.

F. w. costal-half yellow; dorsal, purple, with central black dot. *Desmodifoliella.* [p. 269.]

Legs without white tibiæ.

F. w. with a yellow, trigonal, costal mark.

Mark large, extended to tip of wing.

* See *ante*, p. 91. H. T. S.

† See *ante*, p. 215. H. T. S.

‡ See *ante*, p. 257. H. T. S.

§ Unfortunately Dr. Clemens has omitted to say from what he bred this. *Desmodium* (Tick-Trefoil) is a genus of the *Leguminosæ*. H. T. S.

F. w. reddish-violet; mark distinct, single; base of inner margin yellow. *superbifrontella.* [p. 91.]

F. w. dark purple; mark indistinctly double; base of inner margin dark purple. *Blandella.* [p. 257.]

Mark small; f. w. purplish, with costal spots. *coroniella.* [p. 243.]

F. w. with fasciaform, white markings.

Markings broad; with exterior costal spots. *fulgidella.* [p. 92.]

Markings narrow, without costal spots.

With four equidistant streaks. *venustella.* [pp. 92 & 216.]

With one long costal and dorsal streak near the tip of the wing. *strigifinitella.* [p. 92.]

Gracilaria Desmodifoliella. G. violacella, Proc. Ac. Nat. Sci., Jan. 1860, p. 7.* The costal half of the fore-wings, limited by the fold, is yellow; the dorsal half purple, and the edge of the latter curves to the costa a little interior to the tip of the wing. In the middle of the wing, on the edge of the purplish portion, is a black dot, and the costa along the middle has a few dots of the same hue, but not so conspicuous. Cilia purplish. Hind-wings dark fuscous; cilia the same.

Head and antennæ purplish. Face white. Labial palpi white, with the ends of the middle and terminal joints touched

* See *ante*, p. 93. H. T. S.

with brown. Hinder pair of legs yellowish; middle and anterior purplish-brown, with *white tarsi.**

NEPTICULA, Zell.

Proc. Acad. Nat. Sci. Philad., June, 1860, p. 214;† Proc. Ent. Soc. Philad., March, 1862, p. 149;‡ Id., Nov. 1861, p. 82;§ Id., Jan. 1862, p. 133.‖

Since the foregoing pages were written, I have been successful in rearing *N. saginella* from leaves of oaks, collected during the latter part of July; and I am therefore able to say definitely, that while the Nepticuliform mines in the leaves of the chestnut *may* be produced by the larva of *Bucculatrix trifasciella*, those in the leaves of oaks are certainly the work of a *Nepticula* miner.

The mines in chestnut leaves are shorter than those in oak leaves, although very similar in appearance.

The following is a table of the species described to the present time.

Fore-wings without spots or fasciæ.

Pale ochreous, dusted with blackish-brown. *saginella.* [p. 175.]

F. w. with a white spot and a costal streak.

Dark brown. *Platanella.* [pp. 173 & 183.]

F. w. with pale or silvery fasciæ.

Blackish-brown; fascia median, curved. *Rubifoliella.* [p. 152.]

Purplish-fuscous; fascia oblique, rather broad. *fuscotibiella.* [p. 182.]

Bronzy-green; with two fasciæ. *bifasciella.* [p. 183.]

* Here stress is laid upon the "white *tarsi*," but in the table of the genus we read "legs with white *tibiæ*." Either *tarsi* or *tibiæ* is probably a misprint, but without knowing the insect described it is impossible to say which is the erroneous expression. H. T. S.

† See *ante*, p. 152. H. T. S.

‡ See *ante*, p. 192. H. T. S.

§ See *ante*, p. 171. H. T. S.

‖ See *ante*, p. 182. H. T. S.

20 *Nepticula saginella*, Proc. Ent. Soc. Philad., Nov. 1861, p. 85.* Fore-wings pale ochreous, sprinkled or dusted freely with blackish-brown over the entire surface. Cilia ochreous, slightly clothed with blackish-brown.

Head and face blackish-brown. Eye-caps ochreous.

The larvæ were taken nearly half-fed in leaves of black oak, on the 29th of July, and at this date most of the mines are abandoned. The larva is bright green, with a central dark-green line of ingesta. Head slightly touched with brownish.

The mine is a serpentine, rather short tract, which, when occupied or recent, is white and nearly transparent, with a narrow, very black central frass line. It is frequently bent or curved as the larva approaches maturity. The cocoonet is yellowish-white. Both the imago and larva are very small.

Upon the authority of Mr. H. T. Stainton, for which I feel the highest respect, "the six anterior legs so universally present in Lepidopterous larvæ are wanting in *Nepticula* larvæ, and are replaced by membranous processes or prolegs; each of the remaining segments is furnished with a pair of prolegs, making eighteen in all." I find, after a careful examination, that counting the head as the first segment in *N. saginella*, the third and fourth have a pair of legs, the fifth segment is without any, and the six following segments are each supplied with a pair of prolegs. So that the formula for the legs of *N. saginella* would stand thus, making sixteen in all:

. . 2 . 6
2 . 6 . .

I have not yet examined the neuration of *N. saginella*, and it may be that it is a *Trifurcula*. An examination necessitates the destruction of the minute specimen, and I wish to defer it till I have secured others. It appears to me, however, that

* See *ante*, p. 175. H. T. S.

the eye-caps are too large to permit *saginella* to remain amongst the *Nepticulæ*. The larvæ of *Trifurcula* are entirely unknown, so that one can receive no assistance in classification from a knowledge of their habits.

Bucculatrix, Zeller.

Proc. Acad. Nat. Sci., Jan. 1860, p. 13;* June, 1860, p. 211.†

Bucculatrix trifasciella. Fore-wings ochreous, with three silvery, equidistant costal streaks, the first near the base, the last at the beginning of the apical cilia, with the spaces between them somewhat darker than the general hue. On the middle of the dorsal margin is a spot of blackish-brown, with a patch of dispersed scales of the same hue exterior to it, limited externally by a silvery dorsal streak. At the extreme tip is a small blackish-brown spot, with an intercilial line of the same hue exterior to it. Cilia ochreous. Hind-wings fuscous; cilia the same.

Antennæ fuscous. Head ochreous; eye-caps somewhat silvery-white.

The cocoonet of this species was found on the leaf of a chestnut tree early in July. The cocoon is elongated, ribbed externally, and dark gray. The imago appeared in the latter part of July.

The leaves of chestnut are mined early in the season by a larva that I have regarded as a *Nepticula* from the characters of the mine, but I am now disposed to think that the mine is made by the larva of *trifasciella* during its early life. This mine is noticed in the Proceedings for November, 1861, p. 85, under *Nepticula saginella*.‡

* See *ante*, p. 108. H. T. S.
† See *ante*, p. 146. H. T. S.
‡ See *ante*, p. 175. H. T. S.

INCURVARIA, Haw.

Proc. Acad. Nat. Sci., Jan. 1860, p. 5.*

Fore and hind wings lanceolate, pointed. Fore-wings, subcostal vein with three branches near the end of the disk; apical branch furcate near its base; discal nervules two. Hind-wings, subcostal vein furcate; discal nervule one.

Incurvaria mediostriatella. Fore-wings iridescent bluish-purple, with a broad golden stripe from the base to the middle of the dorsal margin, leaving a stripe of the general hue on the base of the dorsal margin, and with a rather broad obliquely placed costal streak, of the same hue, at the beginning of the apical cilia. The cilia are intermixed with golden scales. Hind-wings reddish-purple, cilia fuscous. Antennæ and head pale yellowish.

Taken on wing in damp woods, the latter part of July.

This species differs, in some respects, from both *russatella* and *Acerifoliella* and from the European typical species. The antennæ are nearly if not quite as long as the fore-wings, and perhaps in the future it may be necessary to create a new group for its reception. I have not deemed this advisable at present, as its oral parts are quite identical with those of the genus.

Easton, Pennsylvania.

* See *ante*, p. 89. H. T. S.

[Extracted from the Proceedings of the Entomological Society of Philadelphia, Vol. VI. pp. 221, 222, November, 1866.]

NOTES ON THYRIDOPTERYX EPHEMERÆFORMIS.

BY BRACKENRIDGE CLEMENS, M.D.

[This is an inquiry into the synonymy of Haworth's *Sphinx Ephemeræformis*, and concludes thus :]

The synonymy of this species would therefore stand as follows:

THYRIDOPTERYX EPHEMERÆFORMIS.

Sphinx Ephemeræformis, Haw., Lep. Brit. 72.

Ægeria Ephemeræformis, Stephens,* Ill. Brit. Ent., Haust., I. 145.

Thyridopteryx Ephemeræformis, Stephens, Trans. Ent. Soc. Lond., Vol. I. p. 76, pl. 10, f. 1; Ill. Brit. Ent., Haust., Vol. IV.; Doubleday, on some N. American Lep.—Entomologist, p. 97; Gosse, Zool., II. 537; Walker, Cat. Brit. Mus., IV. 959, 60.

Œceticus coniferarum, Packard, Proc. Ent. Soc. Phila., Nov. 1864, p. 351.

Hymenopsyche coniferarum and *thoracicum*? Grote, Proc. Ent. Soc. Phila., Dec. 1865, p. 248.

This was the last Entomological paper which was published by Dr. Brackenridge Clemens. H. T. S.

* Dr. Clemens has here erroneously written Haw. H. T. S.

DEATH OF Dr. BRACKENRIDGE CLEMENS.

[Extracted from the Proceedings of the Entomological Society of Philadelphia, Vol. VI., Proceedings of Meetings, p. xvi, February 11th, 1867.]

The Corresponding Secretary announced the death of Dr. Brackenridge Clemens, of Easton, Pa., a Corresponding Member of the Society.

The following Preamble and Resolutions were then adopted:—

"Whereas, It has pleased God in His omniscient Providence to remove from earth and friends, Brackenridge Clemens, M.D., of Easton, Pa., a Corresponding Member of this Society, and as this Society is desirous of testifying its high appreciation of one, who, during his life, had been a devoted student of Entomology, and whose works are the evidence of the high literary and scientific attainments of the Author, therefore be it

"*Resolved*, that the decease of Brackenridge Clemens, M.D., has taken from the Entomological Society of Philadelphia a good and faithful Member, whose heart was ever open to the calls of Entomological Science.

"*Resolved*, that the Society has lost one, whose ability was great, and the acuteness of whose mind was large, capable of searching to the greatest depths, and bringing therefrom the long sought knowledge.

"*Resolved*, that this Society would respectfully express its deep sympathy with the family of the deceased, in this period of deep affliction by which it has been visited.

"*Resolved*, that a copy of the above Preamble and Resolutions be forwarded to Mrs. Brackenridge Clemens, by the Secretary."

CHAPTER IV.

Correspondence between H. T. Stainton and B. D. Walsh of Rock Island, Illinois, on the Death of Dr. Brackenridge Clemens.

Mountsfield, Lewisham, near London,
July 23rd, 1867.

To B. D. Walsh, Esq.

Six years ago Dr. Hagen, who was then spending a fortnight with me, mentioned your name to me, and suggested that I should find you a valuable correspondent.

Since then I have frequently perused with pleasure your papers in the Proceedings of the Entomological Society of Philadelphia, but I had already one American Correspondent in Dr. Brackenridge Clemens, and as I find it some trouble to keep up with all my European correspondence, I did not desire to increase my trans-Atlantic correspondence.

Now, alas! poor Clemens is dead. His portrait hangs before me as I write. I ask myself, shall I ever know such another Micro-Lepidopterist out of Europe? To have done what he did, with all the disadvantages of a new country, with no collections for reference, appears to me marvellous!

I should be very glad if you could give me some information of the latter days of Dr. Clemens. I have heard nothing but what I see in the Proceedings of the Entomological Society of Philadelphia, Vol. VI. No. 2.

I had not heard from Dr. Clemens since October, 1860. I had written twice to him in 1863, but no reply. No doubt, like myself, he was very fully occupied with correspondents nearer home.

It occurs to me that unless some other Micro-Lepidopterist rises up in your country, you may occasionally wish to make use of me to determine species that you may breed. I shall

at all times be most happy to do so to the best of my ability.

* * * * *

I was extremely interested in your notice of the habits of the larva of *Batrachedra salicipomonella*. As far as I can yet learn our *B. præangusta* is not a gall-feeder, but I cannot say that I yet know the whole of its history.

H. T. STAINTON.

ROCK ISLAND, ILLINOIS,
August 12th, 1867.

H. T. STAINTON, Esq.

YOUR very agreeable letter of July 23rd came to hand a few days ago.

I have nothing to tell you of the latter days of poor Dr. Clemens, except what I learnt from his letters.

In 1861 he dropped me as a correspondent just as he did you; and from August 12th, 1860, to July 5th, 1863, I never heard a word from him. At the latter date he mentions having received a letter from you; so it could not have miscarried. Then follows another long gap in our correspondence of 14 months, and on Septr. 4th, 1864, he "hopes that, when the present political conditions are replaced by purer and more humane principles—when we are once again under a government of law and not fanaticism—to turn again to the quiet and absorbing pursuits of science."

Then another gap of 10 months, to July 21st, 1865, when he remarks that "other duties have so absorbingly demanded attention, that for the past few years he [Dr. C.] has forgotten to collect, observe, or write." After that date—the Civil War being then over, and the late rebels in high spirits again—I heard from him pretty frequently.

The truth of the matter, I suppose, is that Clemens had connections in Virginia, and for aught I know may have been a Virginian by birth; and throughout the war his sympathies were with the South. For myself I am an ultra-radical, and if I recollect rightly, I answered his sneers at

Northern "fanaticism" by showing that the Pro-slavery men were the real fanatics, if fanaticism meant flying in the face of the moral sense of the whole civilized world. We neither of us afterwards recurred to the subject; but I have little doubt that it was anxiety for the fate of the South, and not as you suppose his "being very fully occupied with correspondents nearer home," that prevented him from answering you in 1863.

On looking further through our correspondence, I see that he says himself that he was a native of Virginia. "*Hinc illæ lachrymæ.*" Who can wonder that, under the circumstances, the terrible calamities of the war pressed with double weight upon his mind?

* * * * * * *

B. D. Walsh.

INDEX.

Those species marked **I.** were only known in the perfect state; those marked **L.** were only known in the larva state.

		PAGE
	ADELA	249
I.	Ridingsella	250
	AMYDRIA	55, 59, 60
I.	effrenatella	55
	Anacampsis cerealella, Harris	112
	A. Robiniella, Fitch ..	208
	ANAPHORA	56, 59, 60
I.	arcanella ..	57, 58
I.	plumifrontella	57
I.	Popeanella	57
	ANARSIA	127
	pruniella	128
	ANESYCHIA	254
	sparsiciliella	255
	ANORTHOSIA	110
I.	punctipennella	111
	ANTISPILA	103
	cornifoliella	103
	Isabella	142
	nyssæfoliella	102
L.	viticordifoliella	142
	ARGYRESTHIA	93
I.	oreasella	93
	Argyromiges Pseudacaciella, Fitch	208
	A. quercifoliella, Fitch ..	139
	ASPIDISCA .. 104, 143,	147
	lucifluella	143
L.	ostryæfoliella	171
L.	pruniella	171
L.	saliciella	171
	splendoriferella	105
	BATRACHEDRA	264
	salicipomonella	265
	BEDELLIA	95
	somnulentella	189
	Staintoniella (somnulentella)	96, 189
	BRACHILOMA	232
I.	unipunctella	232
	BRENTHIA	133
I.	inflatella	209
I.	pavonacella	134
I.	Virginiella	257
	BUCCULATRIX	108
I.	agnella	147
I.	coronatella	109
	pomifoliella	146
	trifasciella	271
	BUTALIS	126
I.	flavifrontella	126
I.	fuscicornella	126
I.	matutella	127
	CALLIMA	122
I.	argenticinctella ..	123
L.	CATASTEGA	177
L.	acerella	178
L.	Hamameliella	178
L.	timidella	177
	CHAULIODUS	235
I.	canicinctella	236
	CHRYSOCORYS	132
	Erythriella	122
	CHRYSOPORA	123
I.	lingulacella	124
	COLEOPHORA .. 165,	211
I.	cænosipennella	88
L.	caryæfoliella	166
I.	concolorella	211

		PAGE
	COLEOPHORA—*continued.*	
I.	coruscipennella.. ..	88
L.	corylifoliella	166
I.	cratipennella	259
I.	cretaticostella	89
I.	infuscatella	89
I.	laticornella	88
I.	leucochryscella	211
L.	Ostryæ	167
L.	Pruniella	167
L.	Querciella	168
	Rosacella	251
	rosæfoliella	250
L.	tiliæfoliella	168
L.	Viburniella	167
	COSMIOTES (ELACHISTA) ..	97, 133
I.	illectella..	98
I.	maculoscella	98
I.	madarella	98
	COSMOPTERYX	99
I.	gemmiferella	100
I.	*C. Clemensella*, Stainton ..	100
	CYCLOPLASIS	246
	Panicifoliella	248
	DASYCERA	252
I.	Newmanella	252
	DEPRESSARIA	229
I.	atrodorsella	230
I.	Lecontella	137
I.	pulvipennella	244
	DIACHORISIA	106
I.	velatella..	107
	ELACHISTA	133
	ELACHISTA ?	255
	Brachyelytrifoliella ..	248
I.	illectella	98
I.	maculoscella	98
I.	madarella	98
I.	(?) orichalcella	256
I.	præmaturella	133
	ENDROSIS ?	119
I.	Kennicottella	119
	ENICOSTOMA	230
I.	Packardella	231

		PAGE
	EUDARCIA	.. 101
I.	simulatricella ..	.. 102
	EVAGORA	.. 119
I.	apicitripunctella	.. 120
	GELECHIA	.. 217
	agrimoniella ..	112, 224
I.	angustipennella	222, 224
I.	apicilinella ..	223, 224
I.	brumella ..	.. 239
	cerealella ..	112, 224
I.	detersella ..	116, 225
I.	(?) flavocostella ..	113, 180
I.	flexurella ..	115, 225
	fungivorella ..	.. 261
I.	fuscopunctella ..	218, 225
	gallægenitella ..	242, 259
I.	gilvolinella ..	223, 224
I.	gilvomaculella ..	219, 225
I.	Labradoriella	220, 224, 239
I.	longifasciella ..	219, 225
I.	mediofuscella ..	218, 224
I.	mimella	116, 225
I.	nigratomella	217, 224, 260
I.	ornatifimbriella	.. 242
I.	pullifimbriella ..	223, 225
I.	punctiferella ..	222, 224
	Rhoifructella ..	114, 225
I.	roseosuffusella ..	113, 225
I.	rubidella.. ..	115, 225
	Salicifungiella ..	.. 262
	GLYPHIPTERYX ..	.. 213
I.	impigritella ..	.. 214
	GRACILARIA ..	.. 215
I.	Blandella ..	.. 257
I.	coroniella ..	.. 243
	Desmodifoliella..	.. 268
I.	fulgidella ..	.. 92
I.	strigifinitella ..	.. 92
	superbifrontella	.. 91
I.	violacella ..	.. 93
I.	venustella ..	92, 216
	HAMADRYAS ..	.. 245
	Bassettella ..	.. 246
	HOLCOCERA	.. 225
I.	chalcofrontella ..	.. 226
I.	gilbociliella ..	.. 227

PAGE

Holcocera—*continued.*

I. modestella 227
I. purpurocomella .. 227
Homosetia 234
I. (Tinea) costisignella .. 235
I. (Tinea) tricingulatella . 234
Hybroma 187
I. servulella 187
Hyponomeuta 95
I. multipunctella 95
Incurvaria 272
acerifoliella 90
I. Labradorella 238
I. mediostriatella 272
I. russatella 89
Laverna 130
I. Eloisella 131
I. luciferella 130
Leucanthiza .. 62, 84
amphicarpeæfoliella .. 85
LITHOCOLLETIDÆ .. 61
Lithocolletis .. 61, 62, 169
aceriella 65, 75
æriferella .. 64, 68
argentifimbriella 64, 70
I. argentinotella .. 66, 78
basistrigella .. 65, 66, 69
caryæfoliella .. 65, 74
cratægella .. 66, 76, 141
Desmodiella .. 65, 68
Fitchella 139
guttifinitella .. 65, 76
Hamadryadella 65, 77
L. juglandiella 170
luectiella .. 65, 73
lucidicostella .. 64, 66
obscuricostella .. 64, 71
obstrictella .. 64, 73
ostryæfoliella .. 64, 71
Robiniella .. 64, 66
L. salicifoliella 169
tubiferella 140
Lyonetia 183
I. speculella 184
Machimia 147
tentoriferella 148

PAGE

Marmara 211
salictella 212
Menesta 151
I. tortriciformella 151
Nepticula 171
L. Amelanchierella .. 174
L. anguinella 175
I. bifasciella 183
L. caryæfoliella 174
L. corylifoliella 172
L. cratægifoliella 173
I. fuscotibiella 182
L. juglandifoliella .. 173
L. ostryæfoliella 172
Platanella (L.) 173, 183, (I.) 192
L. platea 175
L. (?) prunifoliella 174
L. rosæfoliella 176
rubifoliella 152
saginella (L.) 175, (I.) 270
L. villosella 174
L. Virginiella 172
Nomia (Chrysopora) .. 123
I. lingnlacella 124
Opostega 179
I. albogaleriella 180
Ornix 176
O. acerifoliella, Fitch .. 90
I. Boreasella 237
cratægifoliella 94
I. festinella 94
L. quadripunctella .. 177
I. trepidella 94
Parasia 136
I. subsimella 137
Parectopa 144
Lespedezæfoliella .. 144
Robiniella 207
Phyllocnistis .. 62, 82
Liriodendronella .. 220
vitigenella 83
Pigritia 135
I. laticapitella 136
I. ochrella 233
I. ochrocomella 232

		PAGE
	PLUTELLA	90
I.	limbipennella	90
I.	mollipedella	91
I.	vigilaciella	90
	PSILOCORSIS	149
	quercicella	149
I.	reflexella	150
	SOLENOBIA	181
	Walshella	181
	STILBOSIS	129
I.	tesquella	129
	STROBISIA	117
I.	emblemella	118
I.	iridipennella	118
I.	levipedella	207
	TENAGA	185
I.	pomiliella	186
	TINEIDÆ	48
	TINEINA	47
	TINEA	49, 59, 60
I.	acapnopennella ..	.. 233
I.	biflavimaculella	49, 50, 237
	carnariella ..	49, 51
I.	costisignella ..	.. 235
I.	crocicapitella ..	49, 51
I.	dorsistrigella ..	49, 50
	lanariella ..	50, 52
I.	nubilipennella ..	50, 52
I.	tapetzella ..	.. 258

		PAGE
	TINEA—*continued.*	
I.	tricingulatella ..	.. 234
I.	variatella ..	50, 53
	TISCHERIA	62, 79
	citrinipennella ..	80, 82
	malifoliella ..	.. 141
	solidagonifoliella	80, 81
	quercitella ..	.. 221
	Zelleriella ..	80, 81
	Thyridopteryx Ephemeræformis, Haworth ..	.. 274
	TRICHOTAPHE ..	.. 121
	alacella	.. 180
I.	flavocostella ..	113, 180
I.	juncidella ..	.. 122
I.	setosella	.. 121
	TRYPANISMA ..	.. 125
	prudens	.. 125
	WALSHIA	.. 240
	Amorphella ..	.. 241
	WILSONIA	.. 253
I.	brevivittella ..	.. 254
	XYLESTHIA	53, 59, 60
	pruniramiella ..	.. 54
	YPSOLOPHUS ..	.. 227
I.	flavivittellus ..	.. 254
I.	paucigutellus ..	.. 228
I.	punctidiscellus ..	.. 228
I.	unicipunctellus ..	.. 229

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extend considerably beyond the extremity of the body. The head terminates in front in a small conical point,

ENTOMOLOGY.

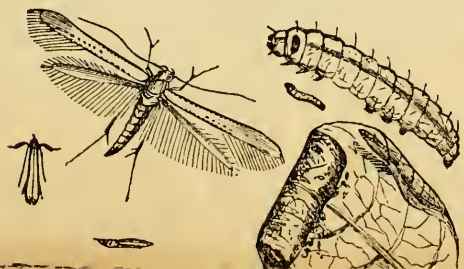
Gracilaria rufipennella.

The common Walnut tree is remarkable for its freedom from the attacks of insects, the peculiar flavour of the leaves being the probable cause of this immunity; indeed, Loudon, in his "Arboretum Britannicum," does not enumerate a single species of insect attached to this tree, although the Black Walnut of North America nourishes the caterpillars of a large moth of the same genus as our great red under-wing moth. A small beetle, however, Lyctus Juglandis, lives under the decaying bark of the English species.

It was therefore with considerable surprise that, in passing along the high road from Botzen to the Brenner Pass in the Tyrol in the third week of last May, we observed that the greater part of the Walnut trees which are planted along the road sides had the appearance of having been scorched or affected by a very severe frost, a great proportion of the leaves having a large portion brown and withered. On examining them we found this was caused by their having been rolled up and gnawed to pieces by numbers of minute caterpillars, many of which were still within the rolls, although the greater part of the mischief had already been completed, and the caterpillars left their rolls. There was nothing peculiar in the manner in which the roll was formed, of which an idea will be obtained from the accompanying figure. There had been considerable rain at the time, and a good deal of the excrement of the larvæ combined to give the leaves a decayed state.

The caterpillars are rather more than a quarter of an inch long, fleshy, with a few very fine erect hairs on the different segments of the body. They have a semi-transparent skin, and are of a dull clay colour with a dark brown streak down the body formed by the visceral canal, the jaws are brown, and on the first segment of the body is a darker-coloured horny patch or scale. When ready to assume the chrysalis state these caterpillars had become of a very pale green colour, with the head and tail slightly clay-coloured. In addition to the three ordinary pairs of legs attached to the first three segments, and the single pair at the extremity of the body, these caterpillars were only provided with three pairs of ventral feet.

When full grown they leave the old roll of the leaf, which they have greatly devoured and rendered unsightly, and curl up a small portion of the margin of the still unconsumed part of the leaf, forming it into a kind of cradle, spun round with pale greenish white silk, and within which they assume the pupa state, which is remarkable for its very slender form as well as for the great length of the pair of antennæ-cases, which



extend considerably beyond the extremity of the body. The head terminates in front in a small conical point, the dorsal portion of the segments of the abdomen is armed with numbers of minute horny points or little reflexed teeth, and the extremity of the body is truncate, and also armed with several minute points. When about assuming the perfect state, the chrysalis thrusts itself half out of its silken cradle (as represented in our figure), the little hooks on its back forming an excellent anchor.

The chrysalis state lasts only about a fortnight, and we had the pleasure of obtaining specimens of the perfect insect developed during our stay in Austria, and the fact of the species attacking the Walnut being new to our entomological friends in Vienna, we consider it may be considered interesting to our readers at home.

The perfect insect is very slender and delicate in its form, belonging to a genus thence appropriately named Gracilaria by our tutor in entomology, the late Mr. Haworth. Its specific name, rufipennella, has been determined for us by Mr. Stainton, who has performed such excellent service to the science by his unwearied observations on the transformations of the difficult family Tineidæ to which the insect belongs. The upper surface of the head and thorax and the fore wings are of a reddish brown colour, varying in some specimens to a more orange, and in some to a greyer tint. The fore edge is marked with a paler streak alternating with a great number (about 20) minute black dots; there are also two or three longitudinal rows of similar dots, but very irregular in number and distinctness, along the disk of the wing as well as on the inner margin; the long fringe of the inner margin is dark grey, which is the colour of the hind wings and their still longer fringe; the legs, especially the middle pair, are a good deal mottled with pale grey, black and reddish coloured scales. The tibiæ or shanks of the middle legs are clothed with broad flat scales, and when the insect is sitting at rest, with the extremity of the wings resting on the surface on which it is standing, and the head considerably elevated, the middle legs are thrown out nearly at right angles with the body, and the fore-legs are brought into contact with them, and completely hidden by the scales of the middle feet, as represented in our figure. The perfect insect measures two-thirds of an inch in the expanse.

From the fact of the Walnut tree not having been hitherto observed to be attacked by this insect, and also from the species before us being ordinarily known to infest the Scyamore,* we presume the attack upon the former tree during the present year to be an unusual instance of divergence of habit in the insect, owing to some peculiarity which we have no means of determining, and consequently, in an economical point of view, as not likely to be continuous and therefore permanently injurious to the Walnut tree. *J. O. W.*

* Frey (in his work on the Swiss Tineæ, p. 234) says that the species is found in Alpine valleys on Acer Pseudo-platanus, sometimes in prodigious multitudes.

St Louis
Nov 25 '73

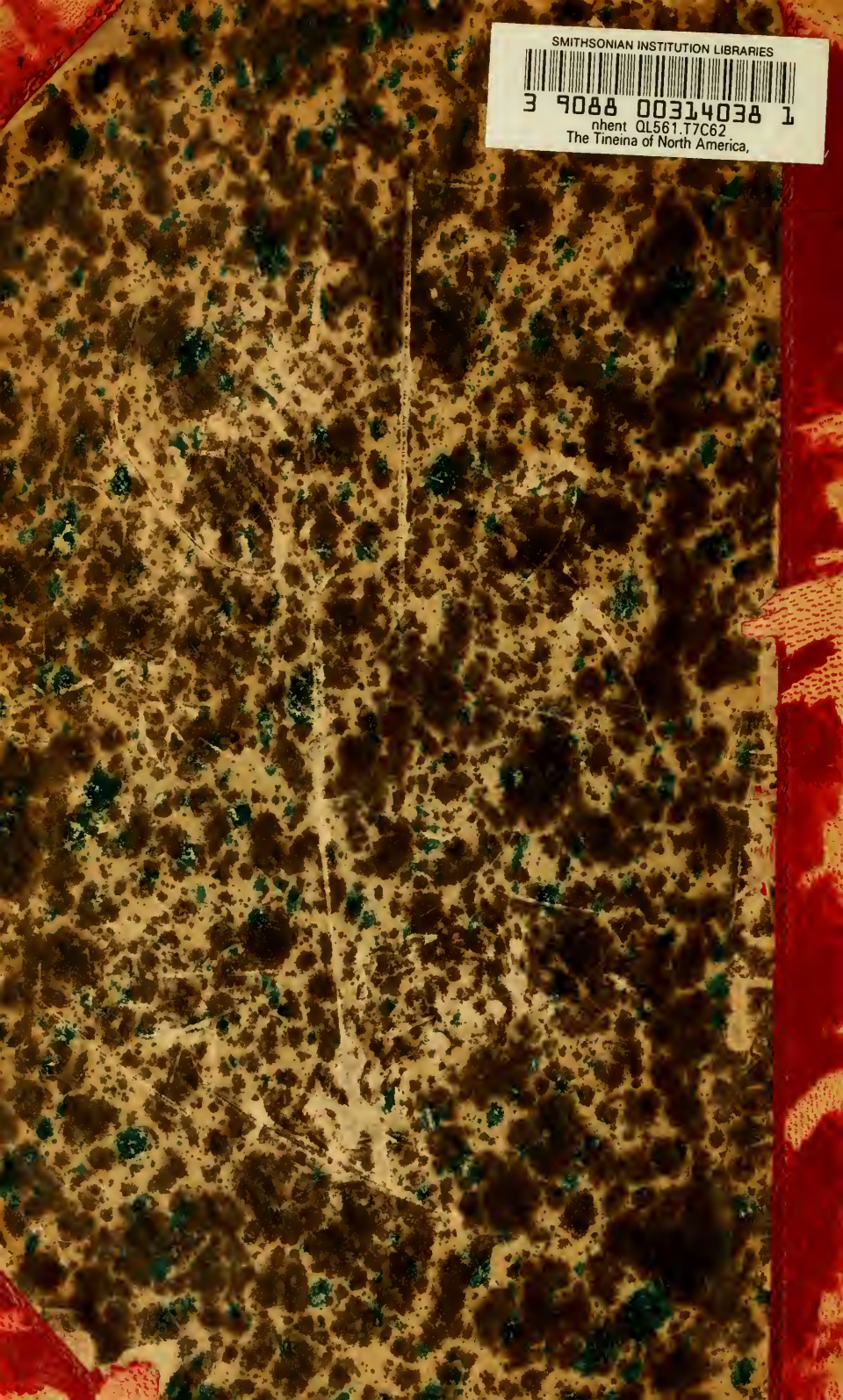
C. V. Riley Esq
Sir

Dr James W. Clements died August 4th 1873 at Arcadia Missouri Age 41 years of Abscess of the Brain. He first took ill Feby 4th 1873 with some pain in head back and limbs. During the latter part of the month he was taken with Pleuro-Pneumonia in both lungs. About March 1st had pain in left temple followed by facial paralysis of left side with double vision due to paralysis of Superior Oblique-muscle of left side, also difficulty of

deglutition due to paralysis of Pharynx of left side, constant pointing except when he would lie on the right side, at the same time had rheumatic inflammation of left leg and rheumatism in shoulder. The last of June deceased was much improved and returned to this city, but on returning to Arcadia was again taken worse and finally died Aug 4th 1873. A few hours before death there was a general flush of the skin with heat. On post mortem Examination there was found an abscess of left Pneumogastric lobule

with softening of the floor of the 4th Ventricle and valve of Vieusens also softening of the Portia dura and Portia mollis and destruction of the origins of the 4th Nerve Glosso Pharyngeal and Pneumogastric nerves. His widows present address at present is Danville Kentucky. I am unable to ascertain his place of birth, but he has a brother living in this city who will likely inform you. If necessary Dr Hodgen of this city will furnish you with a drawing of brain showing abscess.

Respectfully
R. E. Lighthorn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